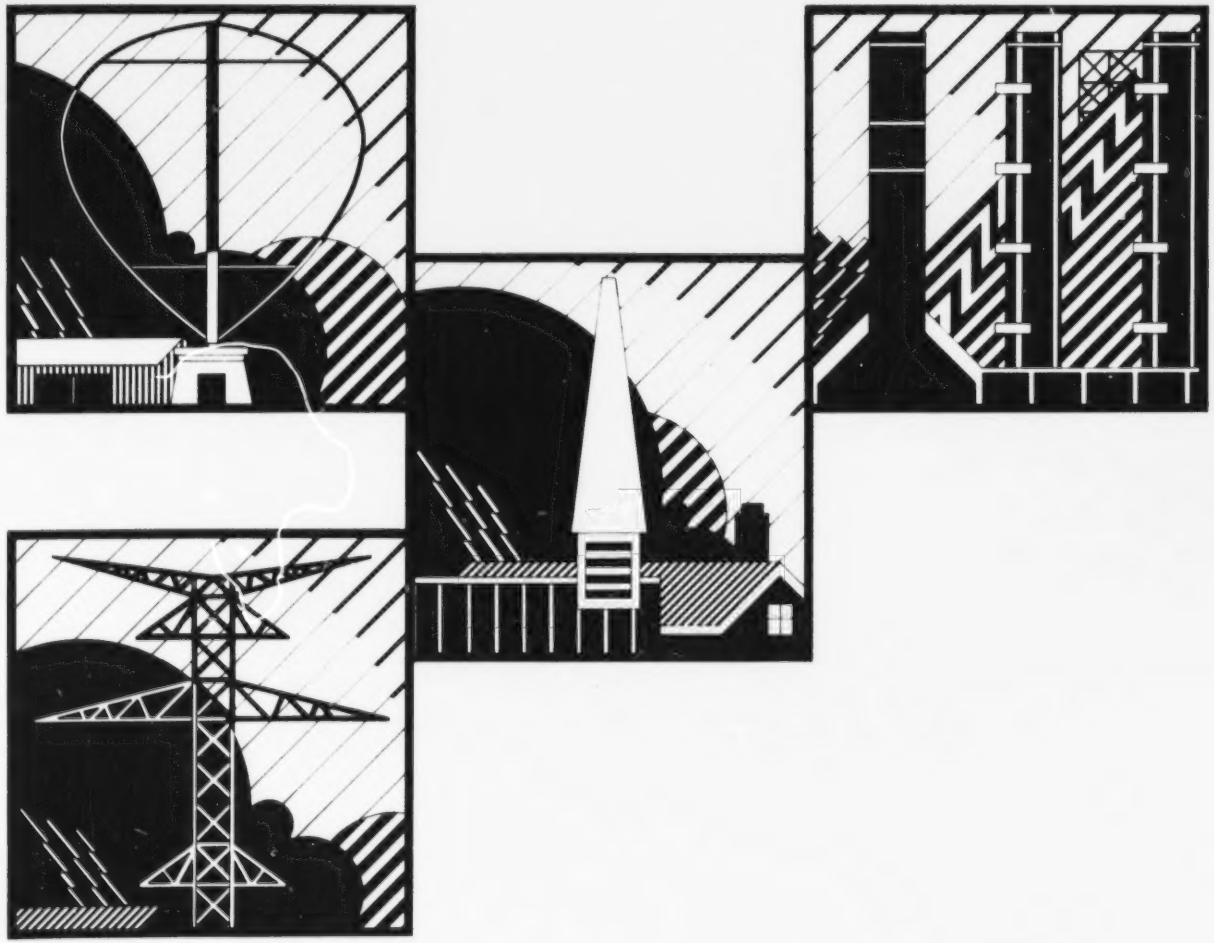


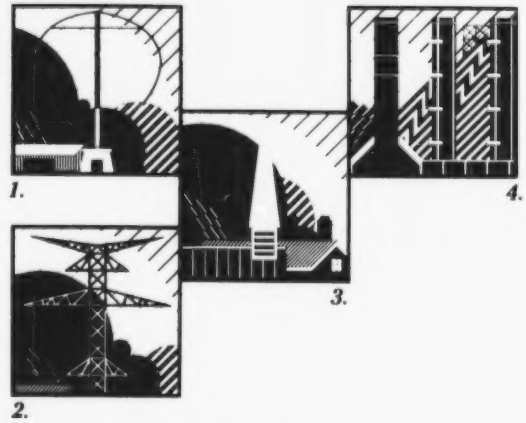
Annual Report of the Ministry of Energy

For the Fiscal Year

1981/82

Ontario

Energy
Ontario



*The Ministry of Energy is actively involved in a variety of energy projects to ensure that Ontario residents will enjoy cost-efficient and reliable energy supplies for the future. The cover design shows the following: **1.** When attached to a diesel-electrical generator operating in a remote community this Darrieus or "egg beater" wind turbine can reduce the generator's fuel consumption by 25 per cent annually. **2.** double-circuit transmission towers form an integral part of the province's electricity supply system, which provides more than 15 per cent of Ontario's energy needs. **3.** the ministry is working with representatives of various religious institutions to help them conserve energy in religious buildings. **4.** the hydrocracker under construction at Suncor's Sarnia refinery will reduce crude oil consumption by one-third while producing the same volume of transportation fuels.*

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Queen's Printer for Ontario
Printed September, 1982

Ontario

Minister

Ministry
of
Energy

Energy
Ontario

Queen's Park
Toronto, Ontario
M7A 2B7
416 965-2041
Telex 06217880

September 1982

TO THE HONOURABLE JOHN BLACK AIRD
O.C., Q.C., B.A., L.L.D.

Lieutenant-Governor of the Province of Ontario

MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the ninth Annual Report of the Ministry of Energy for the fiscal year ended March 31, 1982.

Respectfully submitted

Robert Welch

Robert Welch
Minister of Energy

The Honourable Robert Welch, Q.C.
Minister of Energy

Ontario

Energy
Ontario

Deputy Minister

Ministry
of
Energy

Queen's Park
Toronto, Ontario
M7A 2B7
416 965-2041
Telex 06217880

September 1982

TO THE HONOURABLE ROBERT WELCH, Q.C.
Minister of Energy, Ontario

Sir:

I have the honour to present the ninth Annual Report of the Ministry of Energy for the fiscal year ended March 31, 1982.

Respectfully submitted

Glenn R. Thompson
Deputy Minister

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Deputy Minister's summary

The Honourable Robert S. Welch
Minister of Energy

Dear Minister:

I am pleased to submit to you my report of the ministry's progress for the fiscal year 1981-82.

Unquestionably, the energy highlight of this past year was the signing of the Canada–Alberta Agreement on Energy Pricing and Taxation in September 1981. This Agreement directly affects the prices of approximately 60 per cent of the energy consumed in Ontario. With the signing of the Canada–Alberta Agreement, the basis for Canadian oil and gas pricing policy over the next five years has largely been established. While uncertainty remains beyond 1986, domestic prices in the immediate future are more predictable than ever before.

Nevertheless, Canada still purchases about 25 per cent of its oil supplies on a volatile international market. While the 1980 Iran-Iraq war created oil shortages and adversely affected world petroleum prices, 1981 saw a surplus of crude oil on world markets brought on by conservation, higher prices, and an international economic recession. The instability of this international market reinforces the necessity of Canada becoming self-sufficient in crude oil production.

Ontario consumers face a doubling of prices for gasoline, heating oil and natural gas between 1982 and 1988. Similarly, the commercial and industrial sectors have to adjust to higher energy prices while attempting to sustain economic growth.

These two challenges—helping this nation attain crude oil self-sufficiency and easing the impact of higher energy prices on Ontario consumers and businesses—define our task. By encouraging energy conservation and the substitution of alternative and renewable energy sources, we reduce oil consumption and stabilize the effects of higher energy costs.

If Canada is to meet its goal of crude oil self-sufficiency, new domestic supplies of oil and natural gas must be found and developed. Ontario has argued strenuously for a pricing regime which provides adequate incentive to locate and bring into production new supplies in established producing areas, the oil sands and in frontier areas. The Ontario Energy Corporation's purchase of 25 per cent of Suncor Inc. demonstrates our belief that Canadians must have an increased stake in the development of their oil and gas resources.

To help support crude oil self-sufficiency Ontario is committed to substitute more abundant forms of energy for petroleum products. The province has an extensive network of natural gas distribution facilities, and conversions to natural gas are continuing at very high levels. In 1981 conversions were down somewhat from 1980 levels apparently due to higher interest rates and some initial confusion about the timing and details of federal grant programs.

Electricity continues to improve its share of energy markets. Conversions to electricity for space heating are above expected levels. Ontario's electricity is available to consumers in most parts of Ontario at lower prices than heating oil. Supplies are adequate not just to meet our growing domestic needs but also for expansion into new export markets. Our growing electricity strength will be the source of numerous new energy supply options and opportunities.

Since the introduction of voluntary energy conservation programs almost a decade ago, the Ontario government has led the way in demonstrating practical conservation techniques in commercial and institutional buildings. We initiated these programs to save fuel and tax dollars and to set an example for the community at large. Energy consumption in government buildings has decreased steadily, and this year we moved one step further with a major government employee awareness program urging all employees to be 'energy-wise' in their daily work environment. Called BEST, for Big Energy Savers Team, the program highlights ways individuals can save energy during their daily activities both at home and at work.

We accelerated our community energy management activities by helping municipalities defray the capital costs of converting buildings from oil to alternative fuels, reduce their energy consumption through improved planning practices and pay the costs of hiring energy conservation auditors. Brampton, Burlington, Ottawa and Stratford are designing their own energy management programs with the assistance of the ministry, and their experiences should provide worthwhile examples to other Ontario communities. Advice is also available to religious institutions on the energy conservation methods or techniques most applicable to their buildings.

Helping consumers make the best choice of energy options is one of our top priorities. Heat Save clinics, offering free advice to homeowners on reducing heating costs, were held in Thunder Bay, Woodstock and Toronto. The residential energy advisory program, or REAP, carried out by Ontario Hydro and local utilities, helps homeowners make sense out of the confusing array of energy information available on the market. And within the ministry a strengthened public enquiry unit answered up to 2500 questions monthly on everything from replacing residential oil furnaces to converting gasoline-powered vehicles to alternative transportation fuels.

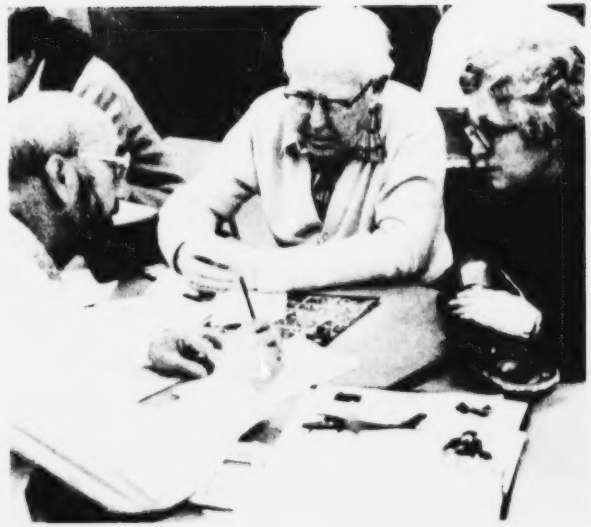
We concentrated on developing and applying new energy technologies in our search for practical and financially viable alternative fuels. Current projects include assessing the potential of municipal solid waste, hybrid poplar plantations, small hydraulic turbines for generating electricity and a new energy-efficient system for producing alcohol fuels.

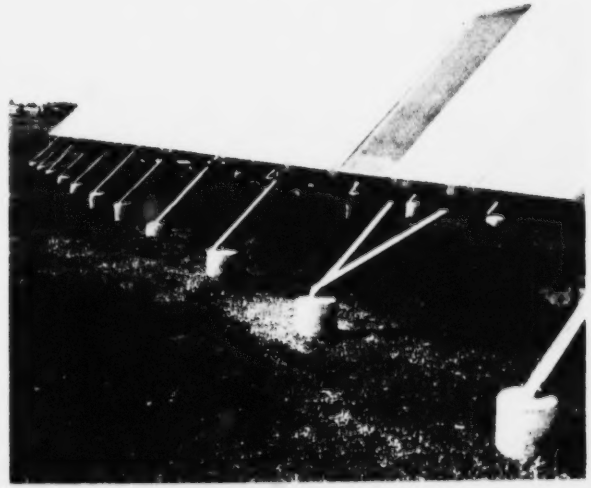
The solar program continues to encourage passive and active solar heating developments. Private developers opened several passive solar demonstration houses in the province, with funding assistance provided by the provincial and federal governments. Thirty Ontario companies received cost-sharing grants worth almost $2.5 million in the first year of our five-year $10 million Commercial Industrial Solar Demonstration Program. And, in co-operation with the federal government we also undertook to fund the largest solar energy project in Canada – a $1.3 million system to preheat the water used by Mohawk Hospital Services Inc. of Hamilton.

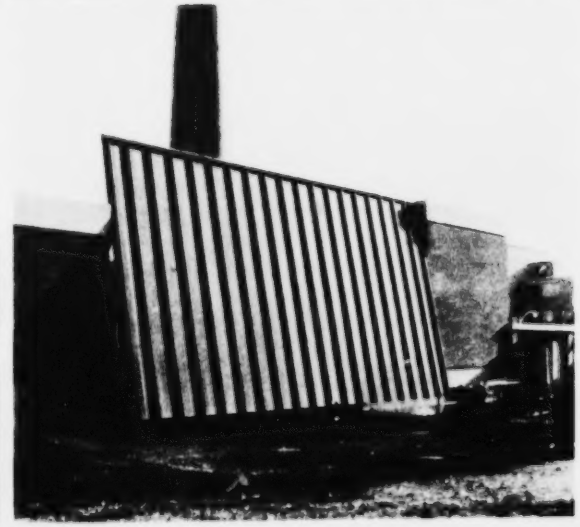
To help Ontario farmers we are working with the Ministry of Agriculture and Food to develop the technology which can make farmers more energy self-sufficient by producing fuel from crops and agricultural waste. We published the Energy and Agriculture Report as a guide to help farmers capitalize on the energy opportunities available to them in the next twenty years.

And as a BILD (Board of Industrial Leadership and Development) initiative we took steps to establish the Institute for Hydrogen Systems to develop hydrogen production and use technologies, thereby building on energy sources (uranium and water) indigenous to this province.

Since joining the ministry in September 1981, I have come to appreciate how much the success of our energy programs in the community at large is the result of the excellent co-operation of other Ontario government ministries, and I anticipate the strengthening of our ties with these ministries and other agencies in the future.







The Ministry of Energy offers consumers free advice (top left) about energy choices at Heat Save Clinics. A natural gas drilling rig is one of many located near Tilbury (top right). The solar program encourages the application of active and passive solar heating in Ontario (lower photos).

Deputy Minister's summary

Proper insulation of existing homes can save dollars in fuel costs and provide year-round comfort

Public awareness and action on energy issues is also increasing. By the end of March 1982, 14 000 Ontario vehicles had been converted to run on propane, a good indication we will surpass our target of 40 000 vehicle conversions by 1985. Approximately 80 municipalities have applied for grants under the Municipal Oil Conversion and Energy Conversion Program. And the ministry has received over 13 000 direct enquiries on the energy options open to home and vehicle owners wishing to convert to fuels not based on petroleum.

It is especially gratifying to see the strides made in energy education in this province. Students today learn about the provincial, national and even international energy scenes and will be better equipped to make intelligent decisions about this province's energy use in the decades to come. Thanks to the combined efforts of the Ministries of Education and Energy and the Ontario Teachers' Federation, more than 200 school boards in Ontario have incorporated some teaching of energy issues into their curriculums.

Nevertheless, there is still much to be done. In the long term Ontario must change to an energy economy based increasingly on renewable and essentially inexhaustible fuels such as hydrogen and electricity from fusion. This province is in a unique position with its high technology and industrial capability to improve the productivity of our energy use and develop new energy forms. We must focus on those measures that meet our energy objectives and stimulate private sector investment and job creation in Ontario as well.

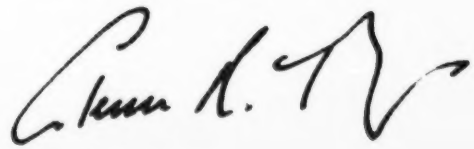
Halfway through the period covered by this report, my predecessor, Malcolm Rowan, transferred to the post of full-time president of the Ontario Energy Corporation. Under Mr. Rowan's guidance (1976-81) the Ministry of Energy became a Canadian leader in energy planning by focusing government attention on developing policies that would lead to crude oil self-sufficiency for Canada and ensure Ontario's energy security in the 1980s and beyond.

Ontario was the first jurisdiction in North America to set specific targets for energy use and supply. The federal government later incorporated some of these targets into its National Energy Program. We proposed a blended price system for Canadian crude oil and actively participated in oil and gas exploration through the investment arm of the Ontario Energy Corporation. It was also during Mr. Rowan's tenure that the ministry initiated a range of programs in the conservation, alternative and renewable energy fields that place us in a leadership role.

Since the creation of the ministry in 1973, its employees have become seasoned veterans in dealing with the ever-increasing demands placed upon them by a rapidly evolving energy scene. As the new Deputy Minister I have been struck by the quality and dedication they have exhibited in the face of very rapid program expansion. Staff development has been impressive and I am confident will continue.

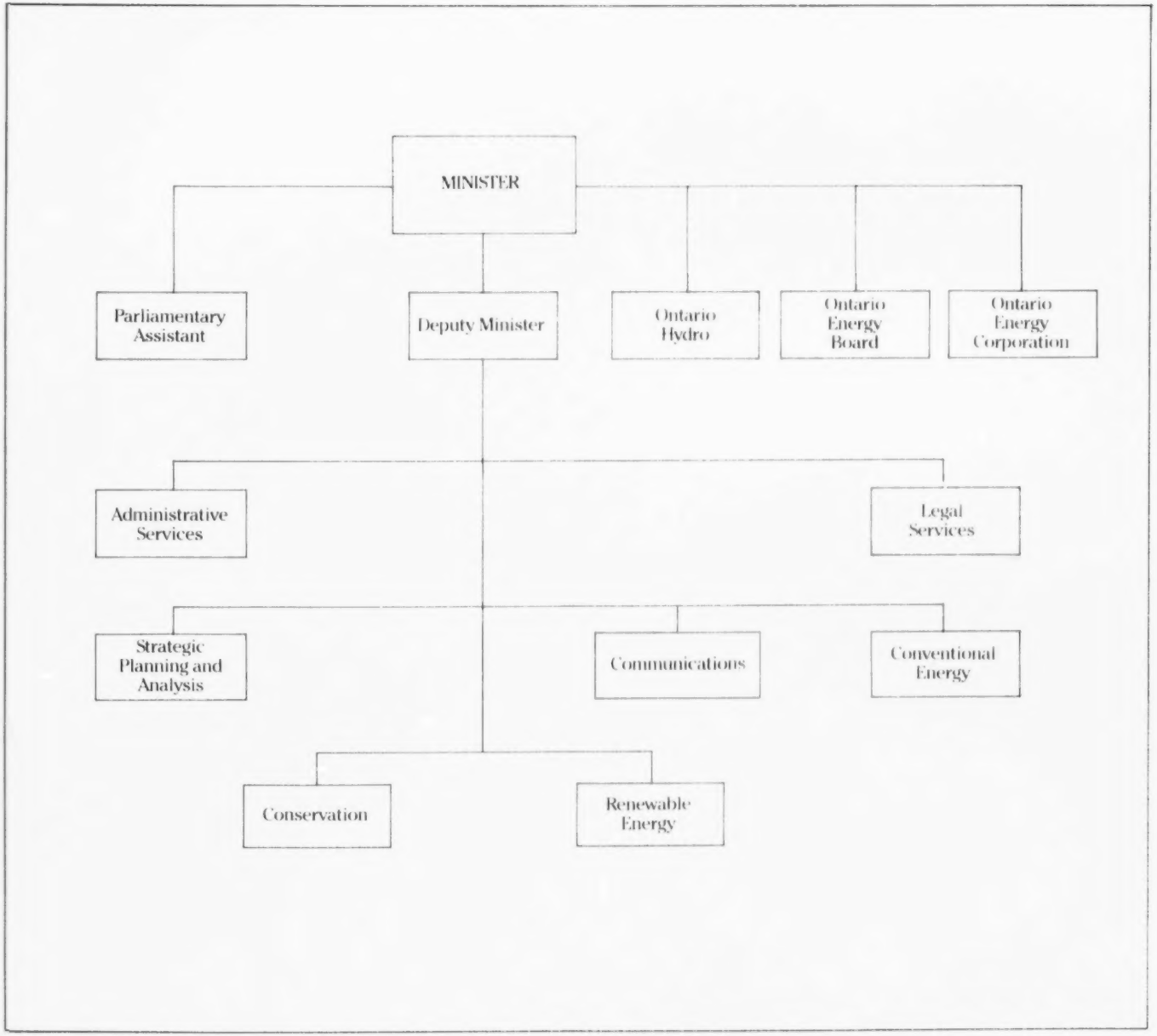
To this end the Ministry of Energy is committed to fulfilling the objectives of the Ontario government's Management Standards Project by improving the management skills of its employees and increasing the overall operational efficiency of government. Through the Affirmative Action Program we intend to increase the job responsibilities and diversify the occupational distribution of women at the ministry, whose staff has reflected the shortage of female employees in those areas of the private sector we deal with most – namely the engineering and economic fields.

It is due mainly to a hard working staff at all levels in combination with excellent programs that I feel assured in saying that the ministry's energy advisory capacity and ability to stimulate conservation and technological development will continue at a high level.



Glenn R. Thompson
Deputy Minister

Ministry Organization



Associated boards and agencies

Ontario Energy Board (Regulation)

The Ontario Energy Board is responsible for regulating Ontario's natural gas utilities, administering the Ontario Energy Board Act and reviewing Ontario Hydro's electrical rates and rate structures.

Details of the Ontario Energy Board's activities are contained in its latest annual report, which can be obtained from:
The Ontario Energy Board
9th Floor,
14 Carlton Street,
Toronto, Ontario
M5B 1K5

Ontario Hydro (Energy supply)

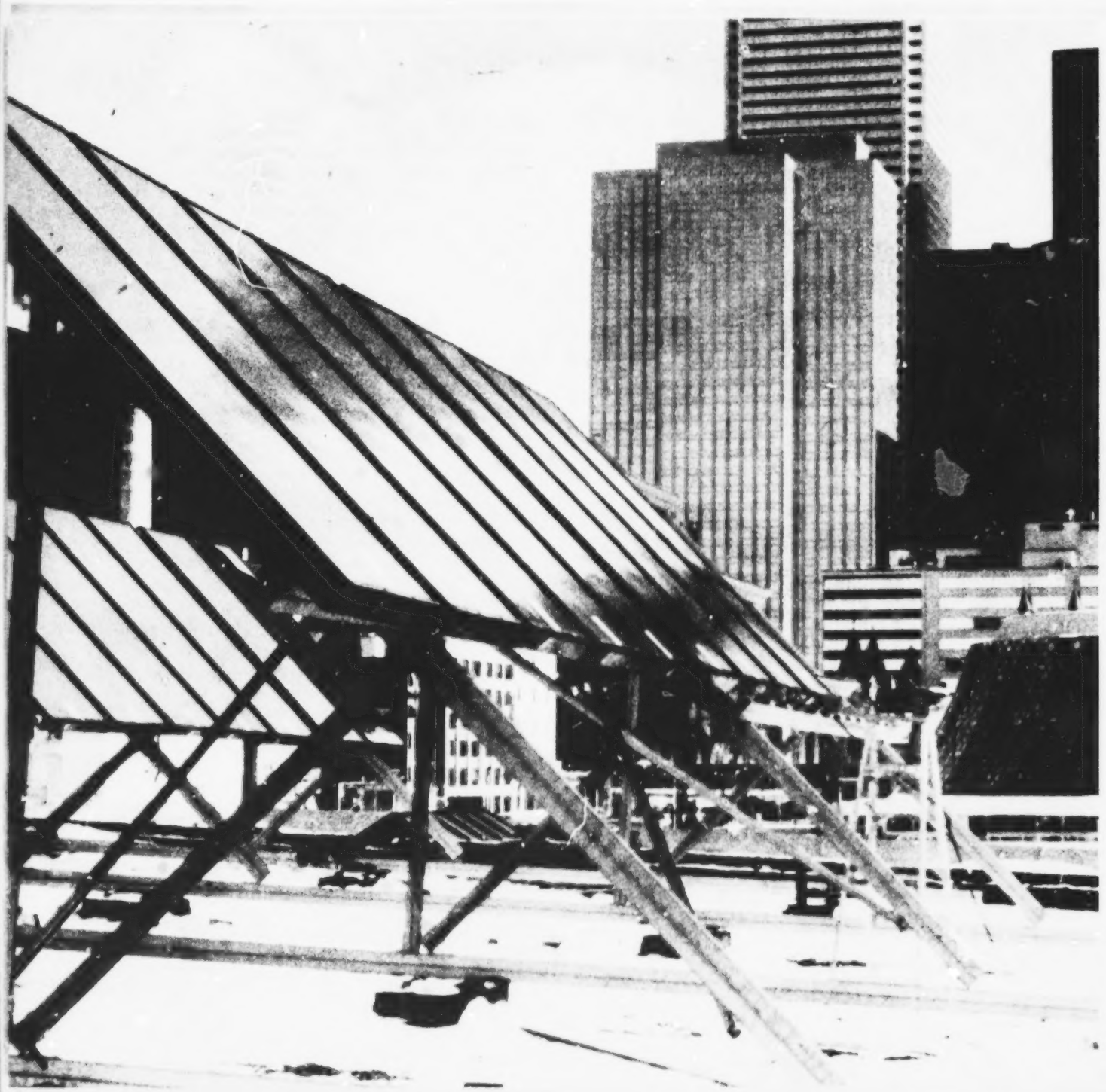
Ontario Hydro is a public corporation, responsible for the generation and supply of most of the electric power in Ontario. The Ministry of Energy is responsible for maintaining liaison and co-operation between the government and Ontario Hydro.

Ontario Hydro publishes annual reports, which can be obtained by contacting:
Ontario Hydro
700 University Avenue,
Toronto, Ontario
M5G 1X6

Ontario Energy Corporation (Energy supply)

The Ontario government established the Ontario Energy Corporation in 1974 to stimulate and to invest in Canadian energy projects that improve the availability of energy in Ontario. All shares are held by the Minister of Energy, and operations are conducted under the Business Corporations Act of Ontario.

Annual reports of the Ontario Energy Corporation can be obtained from:
The Ontario Energy Corporation
101 Bloor Street West,
5th Floor,
Toronto, Ontario
M5S 1P8



A solar panel on the roof of a downtown Toronto building is supplying year-round hot water

Highlights of ministry activities

Students of Grenville Christian College near Brockville will be planting and growing heating fuel

Highlights of Ministry of Energy programs and policy initiatives appear below. The list also reflects Ministry of Energy co-operation with other government and private agencies, during the past fiscal year.

APRIL 8, 1981

The second edition of the Ontario Energy Review is released, containing the most recent statistics available on energy in Ontario and explaining them for those who are not specialists in the field.

April 9, 1981

A passive solar, energy-efficient house, designed to cut heating costs by up to 30 per cent, opens in Chatham. Energy features were funded by the Ministry of Energy and the federal government.

April 14, 1981

The Ministry of Energy and Amex Developments announce they will share the cost of installing solar energy and other energy-efficient features in the Amberwood Village subdivision near Ottawa, to show that an existing subdivision plan can be adapted to incorporate energy-efficient homes.

April 14, 1981

The potential for recovering and selling methane gas produced by Ontario's largest landfill site (Beare Road) is the subject of a study undertaken by the Ministry of Energy and Metropolitan Toronto.

April 24, 1981

A passive solar, energy-efficient house, designed to cut heating costs by more than 50 per cent, opens in Collingwood. Energy features were funded by the Ministry of Energy and the federal government.

April 30, 1981

Eastern Ontario could provide more than a million dry tonnes of wood and wood waste annually to turn into energy, according to a Ministry of Energy study.

MAY 5, 1981

Energy Minister Robert Welch announces plans to encourage private development of Ontario's small hydroelectric sites.

May 7, 1981

A five-year, $10-million Commercial Industrial Solar Demonstration Program begins. During it, the Ministry of Energy will provide grants to industrial and commercial operations, municipalities and charitable and non-profit organizations to share the cost of design, supply and installation of solar systems.

May 7, 1981

The 1981 Canadian Energy Exposition, partially funded by the Ministry of Energy, opens at Ryerson Polytechnical Institute in Toronto.

May 8, 1981

The Ministries of Energy and Natural Resources announce they will help Grenville Christian College near Brockville with the installation of a wood burning heating system and with plans to grow and use its own heating fuel (hybrid poplars).

May 15, 1981

A passive solar, energy-efficient house, designed to cut heating costs by almost 50 per cent, opens in Petrolia. Energy features were funded by the Ministry of Energy and the federal government.

May 20, 1981

Seven passive solar, energy-efficient townhouses, each designed to cut heating costs by up to 57 per cent, open in Ottawa. Energy features were funded by the Ministry of Energy and the federal government.

May 28, 1981

Energy Minister Robert Welch introduces legislation giving Ontario and municipal utilities the authority to offer homeowners energy advice and loans to make their homes more energy efficient under the Residential Energy Advisory Program (REAP).

JUNE 2, 1981

Energy Minister Robert Welch tables the Ontario government's response to the Final Report of the Royal Commission on Electric Power Planning and announces that Ontario Hydro will proceed with the planning and approvals process for a second 500 kV transmission line from the Bruce generating complex, based on a recommendation made by the Royal Commission.

June 25, 1981

The ministry appoints an adviser on energy conservation opportunities in religious buildings—the first step in a comprehensive energy conservation program designed to meet the special needs of churches, synagogues, mosques and temples.

JULY 2, 1981

A passive solar, energy-efficient house, designed to cut heating costs by up to 65 per cent, opens in Toronto. Energy features were funded by the Ministry of Energy and the federal government.

July 2, 1981

'Tune-up Ontario!' begins its second year, with 50 media personalities from Toronto, Windsor, Ottawa and northern Ontario communities showing that common sense driving habits and a properly tuned vehicle substantially improve gasoline efficiency.

July 6, 1981

The third annual Summer Energy Seminar for Ontario teachers, sponsored by the Ministries of Energy and Education and the Ontario Teachers' Federation, begins at the University of Guelph.

July 6, 1981

Work is under way on a $1 million demonstration project near Sudbury to test the ability of large wind turbines to help diesel generators provide power in communities far from the Ontario Hydro grid. The project is partially funded by the Ministry of Energy and the federal government.

July 9, 1981

Energy Minister Robert Welch urges the province's electrical and natural gas utilities to develop clear and consistent information to help Ontario homeowners decide on the best method of heating their homes.

July 15, 1981

Kakabeka Timber Ltd. receives $116 000 from the Ministry of Energy and the federal government to convert a propane-fuelled dry kiln to a more energy-efficient one fired by wood residue.

July 28, 1981

Ontario municipalities become eligible for Energy Ministry grants of up to 90 per cent of the cost of installing active solar energy systems in new non-profit housing projects.

July 30, 1981

The Ministry of Energy announces that municipalities intending to hire energy conservation auditors can apply for financial assistance under the $3.6 million Ontario Municipal Energy Audit Program.

AUGUST 4, 1981

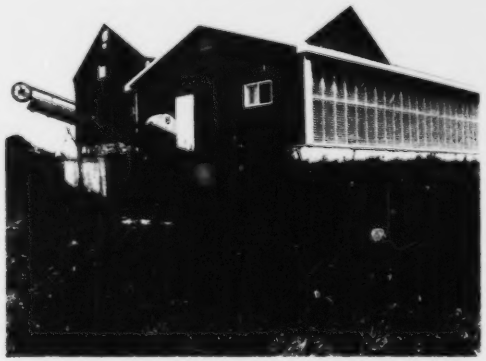
Ontario Energy Minister Robert Welch and Energy, Mines and Resources Minister Marc Lalonde announce the location of two areas in northern Ontario where geological research will begin to assess the feasibility of deep disposal of nuclear fuel wastes in stable rock formations.

August 7, 1981

The Ministry of Energy earmarks $4 million over the next three years to help municipalities defray the capital costs of converting buildings from oil to alternative heating methods.

August 12, 1981

Three Ontario micro-hydro systems receive a total of $267 000 from the Ministry of Energy towards manufacture and installation.



Improving energy management on farms is the target of a 20-year study and demonstration program.

August 18, 1981

Energy Minister Robert Welch presents a paper on Ontario government conservation and alternative fuels programs at the United Nations Conference on New and Renewable Energy in Nairobi, Kenya.

August 20, 1981

A total of 13 solar hot water systems, providing hot water for facilities such as showers and laundries, operate successfully in ten Ontario provincial parks this summer.

August 28, 1981

Thirty Ontario companies receive cost-sharing grants worth almost $2.5 million in the first year of the ministry's $10 million Commercial-Industrial Solar Program.

SEPTEMBER 2, 1981

Ontario and the federal government announce funding of the largest solar energy project in Canada—a $1.3 million system to preheat the water used daily by Mohawk Hospital Services Inc. of Hamilton.

September 10, 1981

Canada's first European-style district heating system, in the Lebreton Flats Demonstration Community, opens in Ottawa. The $1.5 million system is jointly funded by the Ontario and federal governments.

September 22, 1981

Project Heat Save—ministry-sponsored clinics which offer free advice to homeowners on reducing heating costs—opens in Thunder Bay.

OCTOBER 2, 1981

Ontario municipalities are invited to submit proposals to participate in the Ministry of Energy's Community Energy Management Demonstration Program. Chosen participants will receive technical assistance and funding to help them develop energy management strategies and programs in their communities.

October 7, 1981

Ontario and the federal government commit $950 000 towards the first phase of an electrical load-management program under way in Oshawa and Scarborough.

October 13, 1981

The Ontario government, through Ontario Energy Resources Ltd., a subsidiary of the Ontario Energy Corporation, purchases 25 per cent of the shares of Suncor Inc. at a cost of $650 million.

October 15, 1981

Energy Minister Robert Welch introduces legislation to reduce the differential between rural and urban electricity bills to 15 per cent, effective January 1, 1982.

October 16, 1981

Ontario's Hydrogen Energy Task Force reports that the development of hydrogen as a new energy form could be as significant as that of electricity.

October 20, 1981

Ontario and the federal government contribute $127 000 to the development of an energy-efficient ceramic kiln at the Eastern Pottery Division of Waltec Inc. in Cornwall.

October 26–28, 1981

Ontario hosts a world conference on peat resources in Thunder Bay sponsored by the Ministries of Energy, Natural Resources and Northern Affairs and the Canadian National Committee of the International Peat Society.

October 29, 1981

Peel Region receives $350 000 from the Ontario and federal governments for the installation of a new energy recovery system at the Lakeview Water Pollution Control Plant.

NOVEMBER 2, 1981

Energy and Agriculture, a study focusing on ways to improve energy management on Ontario farms during the next 20 years, is released.

November 12, 1981

Project Heat Save opens clinics in Woodstock.

November 12, 1981

Industrial Grain Products in Thunder Bay unveils a $3.5 million waste treatment system that generates energy from effluent before its discharge into a local river. The Ontario and federal governments contributed a total of $500 000 to the project.

November 18, 1981

Old House – New House: Energy Conservation at Ecology House, a film about an energy-inefficient Victorian house that has been redesigned into a showplace of energy conservation, premieres in Toronto. Production and distribution costs were partially funded by the Ontario and federal governments.

November 24, 1981

Energy Minister Robert Welch announces the signing of a contract with the University of Toronto for planning and development that will lead to the establishment of an Institute for Hydrogen Systems in Ontario.

November 30, 1981

'Tune-up Ontario' participants report an average improvement of more than 11 per cent in gasoline efficiency in demonstrations held in six Ontario centres.

DECEMBER 7, 1981

PPG Industries Canada Ltd. in Owen Sound receives $176 500 from the Ontario and federal governments toward the capital and demonstration costs of a waste-heat reclamation project.

December 8, 1981

Saving By Design, a Ministry of Energy film showing how life-cycle costing can affect energy conservation investment decisions, premieres in Toronto.

December 18, 1981

The Ministry of Natural Resources and the Ministry of Energy begin to inventory the small dams in Ontario for their potential as hydroelectric generation sites.

JANUARY 29–30, 1982

Sixty Ontario teachers meet in Toronto for a two-day workshop on energy education sponsored by the Ministry of Energy.

FEBRUARY 1, 1982

Project Heat Save opens clinics in Toronto.

February 5, 1982

The Ministry of Energy allocates $158 000 to help the University of Ottawa install a cogeneration system to produce both heat and electrical power more efficiently.

February 10, 1982

The $1 million wind-diesel hybrid, electrical generation system begins operation near Sudbury.

February 12, 1982

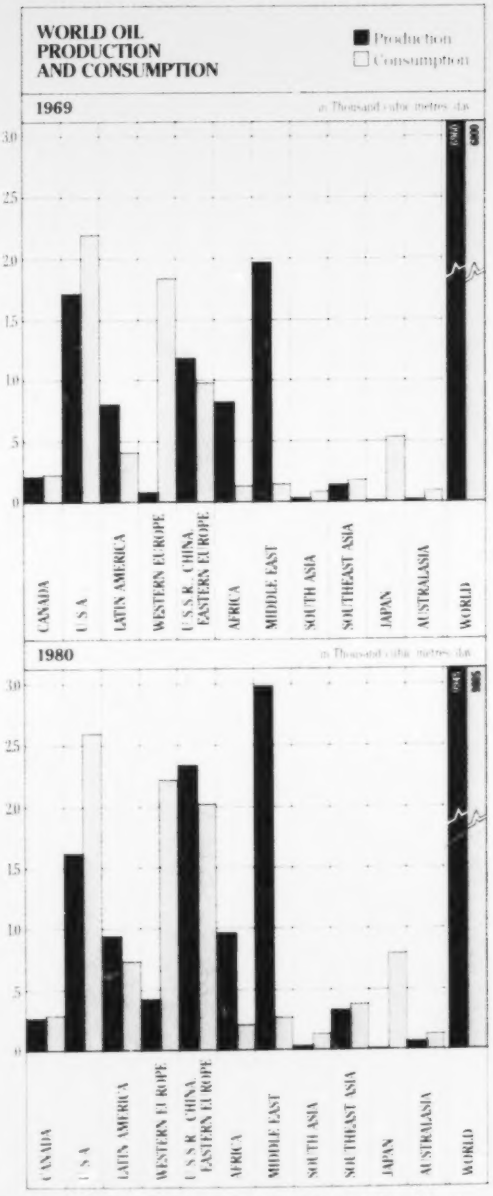
Energy from waste experts from around the world are invited to attend a technical conference and trade show on biomass energy opportunities in Ontario, to be held in Toronto in March 1983.

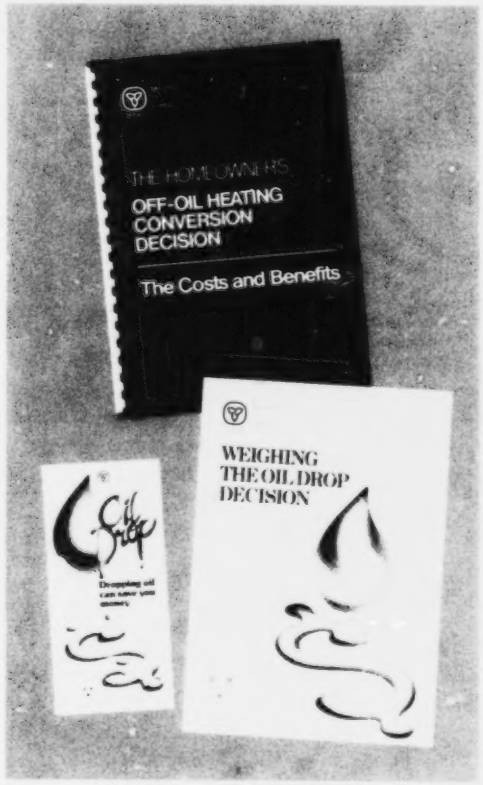
February 16, 1982

The Ministry of Energy begins accepting proposals for the second year of the five-year $10 million Commercial Industrial Solar Demonstration program. In the 1982-83 stage, the federal government will contribute half of the $2 million earmarked to share the cost of designing, installing and commissioning active solar systems for commercial and industrial buildings.

February 16, 1982

Brampton, Burlington, Ottawa and Stratford are selected to participate in the Ministry of Energy's Community Energy Management Demonstration. The cities will receive technical assistance and funding from the ministry to help them develop and implement energy management programs for their communities.





Ministry publications are designed to provide consumers with information on the "off-oil" conversion program

February 18, 1982

The first solar domestic hot water heating system to be added on to an existing apartment building is completed at the Ontario Housing Corporation complex on Morningside Avenue in Scarborough. The project is a joint venture of the Ministry of Energy and the Ministry of Municipal Affairs and Housing.

February 25, 1982

The Ministry of Energy funds community-based action projects in the Regional Municipality of Peel and Richmond Hill to promote energy conservation among citizens and businesses in the surrounding communities.

MARCH 18, 1982

Three solar hot water heating systems, partially funded by the Ministry of Energy, begin operating at the Talisman Resort near Kimberly, Ontario. Two of the systems pre-heat cold spring water for domestic and personal use while the third system heats the outdoor swimming pool year round.

March 24, 1982

Two publications designed to help homeowners and those in the heating business make decisions about off-oil heating conversions are released by the ministry.

March 26, 1982

The Ontario and federal governments announce funding of a solar energy system to heat a municipal indoor swimming pool being constructed as part of the new Dryden Activity Complex.

Communications

The Ministry of Energy Communications Group, located at 62 Wellesley St. W. in Toronto, is ready to answer all public enquiries.

Energy issues demand improved communications

In 1981-82 a rapidly changing energy scene increased the demand for a variety of communications. The Canada-Alberta agreement on oil prices generated more requests for information on furnace conversions and alternative transportation fuels. Media reports about an 'oil glut' seemed to contradict the need for conservation. Recent technical developments on hydrogen, propane and other fuels demanded explanations. And some issues cut both ways—the benefits of energy sources such as nuclear power had to be weighed against the costs, and the balanced decision explained.

Variety is a necessity

The range of needs required different kinds of responses. The public inquiries staff of the Ministry of Energy replies to an average of 2000 personal phone calls, visits and letters a month. Improved phone systems, better staff training and the development of better reference materials during the past year have meant that inquiries can be dealt with more promptly and more thoroughly than ever.

The ministry is also taking part in the Bell Vista Telidon trial with information on some of the most frequently asked questions. Service to the public through the Telidon system offers another avenue for the ministry to respond to public need.

Seminars and special events increased public awareness

Energy communications means more than telephone calls and letters.

Seminars, displays and special events organized by communications staff informed and entertained audiences as varied as those at the Canadian National Exhibition, the Ontario Municipal Electrical Association's annual meeting and the International Peat Symposium sponsored by the Ministry of Energy.

To direct public attention to the many sorts of energy technology invisible to the casual observer, ministry staff produced special events and displays. Official openings to mark solar energy applications at Christie, Brown and Co. Ltd. Bakeries of Toronto and Talisman Ski Resorts in Kimberly are examples.

The Minister as a communicator

The Minister of Energy is the most active communicator on energy issues in the Ontario government.

During the past year the Honourable Robert Welch delivered almost 200 speeches, statements to the Legislature and recorded radio clips on energy topics, as well as presiding at numerous official openings and displays. The importance the Minister gives to addressing his audiences' concerns has set high quality standards for the Communications Branch.

The media as an audience

Rapid changes in energy issues and the many ways they influence daily life guaranteed energy considerable coverage in the media.

The Ministry of Energy began to provide technical briefings to explain various energy aspects to the media. To ensure that reporters bring an informed perspective to their stories, these briefings have been used to explain hydrogen's role in Ontario's future and the economic decision involved in converting from oil to another heating source.

A community program began

As part of the voluntary energy conservation program, the Ministry of Energy began a pilot program in the City of Peterborough during the past year.

'Energy Savers Peterborough' representing 17 volunteer groups plans a year-long program beginning in May 1982 to save energy throughout the community. Members of the ministry's communications staff have been instrumental in helping the group establish itself. Ministry of Energy officials are also members of the ongoing community task force. A planned part of the program is to develop a manual for organizers of similar community activities.

Advertising promoted awareness of conservation benefits

The Ministry of Energy's conservation advertising achieved notable public awareness and approval during the past fiscal year.

In addition to radio and television commercials, the conservation message was promoted with a series of events. The 'Tune-Up Ontario' program, for example, employed media

personalities from various Ontario communities to demonstrate how tuned-up cars and proper driving habits could improve mileage and save money. By tuning up their own cars and improving their driving techniques, media participants increased their mileage an average of 20 per cent per tank of gas and reported the results to their listeners, viewers and readers.

The Ontario Energy Savers News also began this year. A quarterly newsletter distributed to individuals and companies interested in energy conservation, it highlights various ideas for saving energy in the office, plant, home and car. Its first issue brought requests from 75 companies, individuals and municipal governments for more information. Many companies have contributed stories of how they have reduced their energy consumption in their own operations.

The message is clear: energy conservation makes sense everywhere.

Publications, displays and movies expand on messages

The ministry's success in producing movies, publications and displays is implied by the demand for them. One movie, 'Old House, New House,' produced as part of the Canada–Ontario Conservation and Renewable Energy Demonstration Program, has been booked two months in advance even though 100 copies of the film were made.

Several ministry publications on solar energy and off-oil conversions were in such demand that additional copies had to be printed.

The ministry's displays on solar energy, conservation and alternative transportation fuels were in constant demand.

During the past year the ministry also created a major display for its part in the Canadian pavilion at the World's Fair in Knoxville, Tennessee. Responding to the fair's theme, Energy Turns the World, Ontario's display features nuclear technology for its uses in electricity, commercial steam, agriculture and the production of hydrogen.

Energy Ontario

The Energy Ontario symbol informs the public of the energy programs and activities throughout the Ontario government.

Energy is too diffuse for any one government ministry to undertake all government programs. Consequently, some 15 Ontario ministries now have energy programs, all operating under the Energy Ontario banner and co-ordinated by the Ministry of Energy as part of its overall responsibility for energy policy. Special organizational structures have been set up with six key ministries. These arrangements form the basis of this ministry's corporate management approach and include:

- TEMP–The Transporation Energy Management Program, involving the Ministry of Transportation and Communications
- HEMP–The Housing Energy Management Program, involving the Ministry of Municipal Affairs and Housing
- AGEMP–The Agriculture Energy Management Program, involving the Ministry of Agriculture and Food
- REMP–The Resources Energy Management Program, involving the Ministry of Natural Resources
- GEMP–The Government Building Energy Management Program, involving the Ministry of Government Services
- ITEMP–The Industrial Energy Management Program involving the Ministry of Industry and Trade

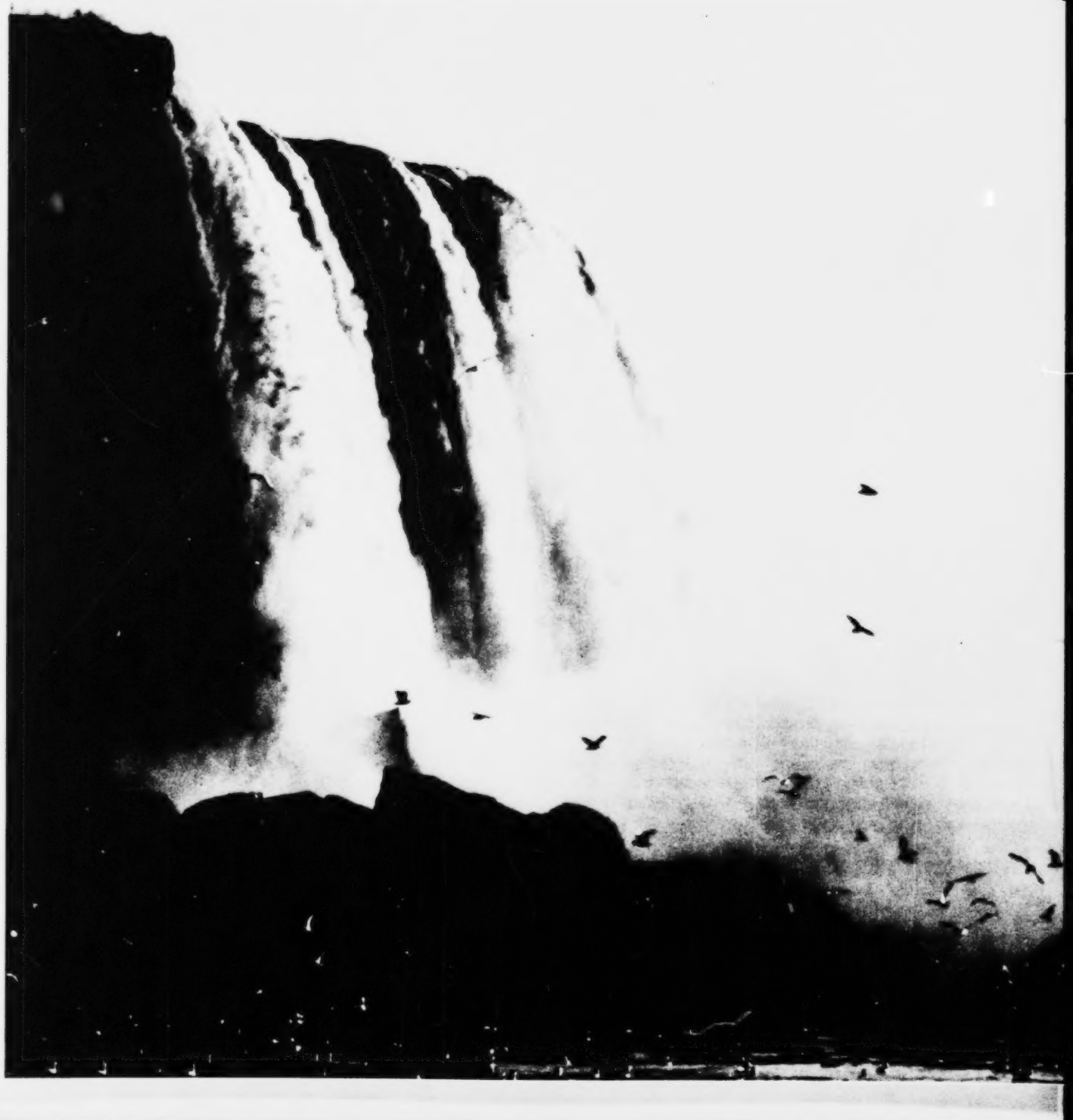
Organizational changes

Producing better and more cost-effective communications has meant organizational changes. The most important and far-reaching changes, dating from November 1981, put more emphasis on planning communications to meet program needs. With the basis of effective planning established, this work continues to be a priority for the coming year.

Other organizational changes to improve the effectiveness, efficiency and speed of communications have begun with the streamlining of management procedures and the staffing of senior positions.

Ministry displays help inform consumers about ways to save energy

Strategic planning and analysis



Much of Ontario's power has its source at Niagara Falls, which supplies the Sir Adam Beck generating station located in the lower Niagara River.

The Ministry of Energy identifies key energy issues and recommends policies and programs that will contribute to the province's future energy security.

The most up-to-date information on the domestic and international energy scenes is gathered and analysed, short- and long-range energy goals for the province are established and plans are developed to ensure that these goals are met. The Strategic Planning and Analysis (SPA) group bears much of the responsibility for these tasks.

SPA staff analyse and project trends in energy prices, demand and supply levels by major economic sector and fuel type.

In 1981/82 close attention was given to assessing energy pricing policies following the announcement of the National Energy Program and the September 1 pricing accord reached between the federal government and Alberta.

Managers of the conservation, renewable and conventional energy sections within the ministry request SPA staff to evaluate existing programs and establish priorities in their respective areas. Similarly, Ontario Hydro uses the SPA group's projections of Ontario's future energy requirements in the development of their long-term electrical load forecasts.

To assist these clients the branch undertakes or commissions a number of special studies each year on key energy topics. This year the group compared the costs of alternatives to oil for space heating in the residential sector and examined the financial viability of producing alcohol fuels from various feedstocks in Ontario.

SPA staff also participated with other ministry staff in a number of ministry and government task forces and studies including:

- Alternative Transportation Fuels Task Force;
- Energy and Agriculture Policy Committee;
- Hydrogen Energy Task Force;
- Rent Review and Energy Conservation Study;
- Electrical Space Heating Task Force;
- Water Rentals Task Force;
- Ontario Hydro Net Income Study;
- Environmental Assessment of Southwestern Ontario Hydro Transmission;
- BILD Committee and Implementation Task Forces.

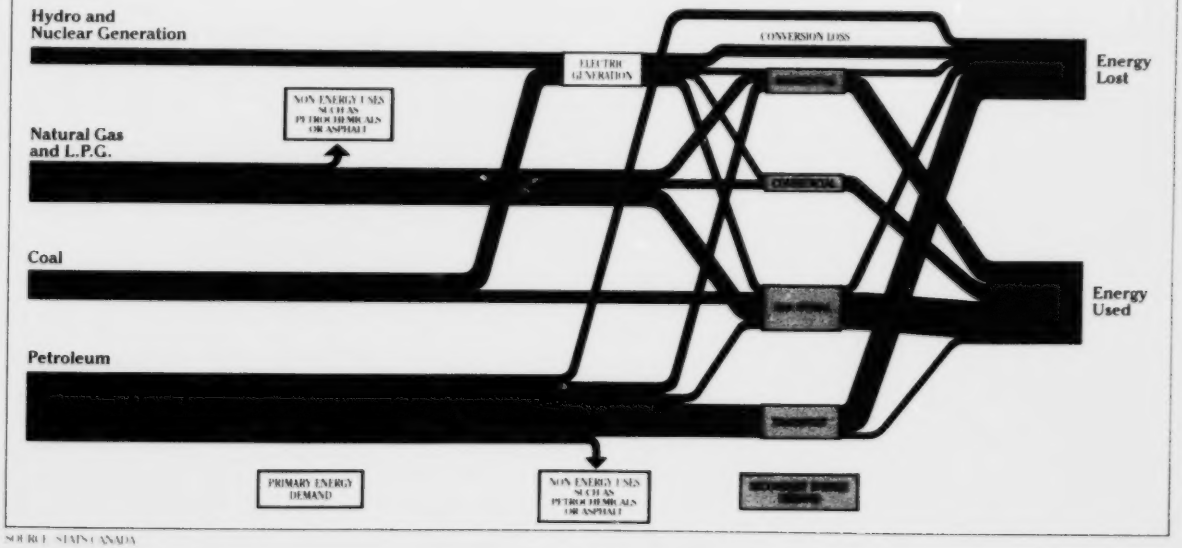
The SPA group also co-ordinated the ministry's annual budgetary allocation process, including the development of the management-by-results statements for ministry programs, and served as the main ministry focus for the government-wide management standards project.

Virtually all the energy information gathered and analysed by the branch is available to the public as well as to other government ministries and agencies. The SPA group prepares and publishes the *Ontario Energy Review*, which describes the province's energy situation and summarizes the information that guides policy development. Energy demand forecasts, prepared for the government since 1978, are published in the *Review* and are also used in Ontario government submissions to the National Energy Board.

The SPA group also answers requests for up-to-date energy data from the public, industry, media and other interested parties.

Under the group's guidance, the ministry's reference library, relocated to larger quarters this year, continues to supply information resources and research services to ministry staff and consultants. This year the library introduced two new automated database systems, implemented microfiche services and conducted staff seminars on materials and services. Library facilities and information are available to the public by appointment.

ONTARIO ENERGY FLOWS 1980



SOURCE: STATS CANADA

Conventional energy

Exploration for oil and gas in the Beaufort Sea in Canada's high Arctic should discover additional oil and gas reserves to reduce the nation's dependence on imported fael

The Ministry of Energy assesses the supply, demand and pricing of crude oil, natural gas, coal and lignite, peat, uranium and electric power. Based on this information it develops policy positions and advises the Ontario government on matters relating to these energy forms.

It represents the Ontario government's energy policy positions before federal and other regulatory authorities, negotiates with the federal and other levels of government to ensure Ontario residents have access to a variety of fuel options and assists in developing the electric power policies within which Ontario Hydro and other agencies carry out their responsibilities.

Fuels and raw materials

The production, availability and pricing of crude oil, natural gas and coal both in Canada and abroad are crucial to Ontario because this province has virtually none of these resources within its boundaries.

Large deposits of lignite (lower-grade coal) and peat have been delineated in recent years, but their energy potential has yet to be realized.

Of the main kinds of energy Ontario uses today, only electricity produced from uranium and water-power comes from Ontario sources.

An important part of Ontario's energy strategy is diversification – not depending too much upon any one source of energy.

Consequently the province is actively investigating its lignite and vast peat reserves for energy production. Exploration is under way for additional deposits of these fuels and for oil and natural gas.

Outside Ontario the government supports oil and gas exploration and development both directly, through the Ontario Energy Corporation's purchase of 25 per cent of the shares of Suncor Inc., and indirectly, through its support of the construction of tar sands and heavy crude oil plants in western Canada and production from frontier oil and natural gas reserves.

Oil

THE WORLD SCENE

During 1981/1982 the international oil situation gradually stabilized, with no major price increases occurring. World demand for oil decreased from nearly 9.9 million cubic metres/day in 1980 to 9.5 million cubic metres/day in 1981.

The economic slowdown in the industrialized nations, reduced demand due to higher prices and conservation programs and the increasing substitution of coal and natural gas for oil accounted for most of this decrease. The decline continued in the first quarter of 1982 to about 8 million cubic metres/day.

The Organization of Petroleum Exporting Countries (OPEC) general agreement on pricing in November 1981 raised the benchmark price of Saudi Arabian light crude from U.S. $32.00 a barrel to U.S. $34.00 a barrel.

Significant non-OPEC production increases, principally from the North Sea and Mexico, combined with reduced demand created a temporary oversupply of world oil. Some producers responded by cutting their prices in the first quarter of 1982 in an attempt to maintain or regain their market share.

Crude oil in Canada

On April 1, 1981, the average wellhead price of Canadian-produced crude oil was $17.75 a barrel. Increases of $1.00 a barrel on July 1, $2.50 on October 1 and $2.25 on January 1, 1982 (the latter two a result of the Canada/Alberta Agreement of September 1, 1981) brought wellhead prices to $23.50.

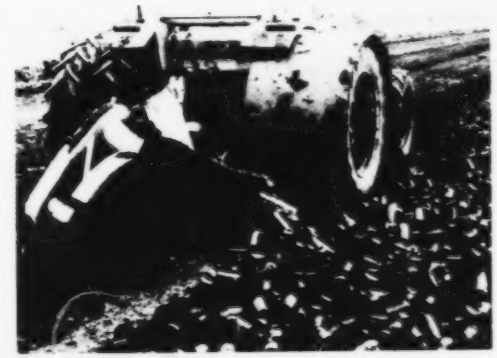
In May 1981 the federal government introduced the Canadianization Levy, a charge against all Canadian refineries to defray the cost of Petro-Canada's acquisition of Petrofina Canada Ltd.

A further increase in the Petroleum Compensation Charge was applied in June 1981.

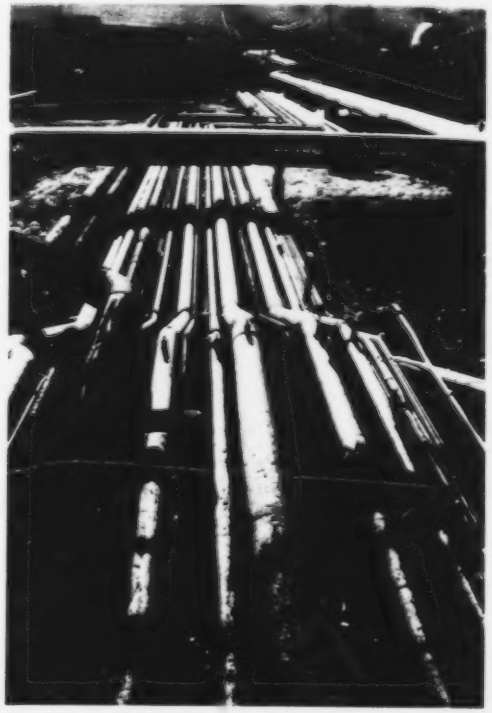
The combined effect of these wellhead price increases and federal government charges raised the cost of Alberta oil to Toronto-area refineries from the $24.66 a barrel reported last year to approximately $32.20 a barrel by the end of March 1982.

On the supply side, encouraging offshore oil discoveries were made on the Atlantic coast and in the Arctic. The degree of commercial exploitation possible will depend on the size of reserves proved by successful drilling across the site of the field, improving the development and transportation technology and establishing a pricing/taxation structure appropriate to the very large investments involved.

Construction of two large Alberta oil sand recovery plants, Alsands and Cold Lake, has been delayed indefinitely. It is now unlikely that substantial new oil supplies will be available from the Atlantic coast and oil sands projects much before the end of this decade.



Peat, one of the world's oldest fuels, is being developed as another alternate fuel source for Ontario.



Natural gas pipelines crossing Ontario are being further expanded into areas not yet served.

Production from Canada's conventional oil fields exceeds discoveries of new reserves. Consequently conventional oil availability is expected to continue its decline. Ministry estimates indicate that production levels over the next five years will decline each year by about 8500 cubic metres daily, down from a production level of approximately 220 000 cubic metres daily in 1981.

Meanwhile the latest statistics suggest that imports of foreign crude oil into Canada increased by 3 per cent in 1981 over 1980.

However, ministry figures also show a decline in Canadian demand for petroleum products of about 7 per cent in 1981 compared with 1980. This trend is expected to continue in 1982, with demand expected to drop an additional 6 per cent.

Similarly, Ontario's consumption is estimated to have declined by 5 per cent in 1981 compared with 1980 and to fall by another 5.6 per cent in 1982.

Declining demand left refineries with significant amounts of spare capacity in all regions of the country. In Atlantic Canada the Point Tupper refinery remains closed, and Quebec refineries are operating well below capacity. In Ontario crude oil consumption is slightly under 70 per cent of refinery capacity.

The petroleum industry is expected to restructure itself in light of this excess capacity and to consider other possible changes leading to more efficient operation.

Ontario refineries face major adjustments in the 1980s and 1990s to accommodate changes in crude oil feedstocks, declining product demand and shifts in the products produced.

These changes in supply and demand cause speculation that there may be an idling or shutdown of redundant refinery facilities in Ontario and Quebec to make better use of remaining facilities. Petrosar has already reduced its construction activities to include only a portion of its planned heavy fuel oil upgrader in Sarnia.

However, at the end of the fiscal year, Suncor Inc. was continuing with plans for major new heavy fuel oil upgrading facilities at its Sarnia refinery.

The Canada–Alberta crude oil pricing agreement stabilized prices for five years and set the price of natural gas at approximately 65 per cent of the refinery cost of crude oil, creating favourable conditions for further penetration of natural gas into the heating market.

The agreement also removed the 85 per cent crude oil price cap established under the National Energy Program (1980), which ensured that the blended price for Canadian oil would never exceed either 85 per cent of the international price or the average price of oil in the United States, whichever was lower.

Natural gas

APPEARANCES BEFORE THE NATIONAL ENERGY BOARD

The National Energy Board (NEB) approves applications for new natural gas pipelines and associated energy projects to ensure the public interest is best served. It regulates the amount of Canadian natural gas exports and sets rates, tolls and tariffs for pipelines that cross provincial and international borders. Most NEB decisions are subject to the federal cabinet's approval.

The Ministry of Energy, on behalf of the Ontario government, intervenes in cases before the NEB which raise issues affecting Ontario's long-term security of supply and the price Ontario consumers will have to pay for Canadian natural gas.

In 1981–82 the Ministry of Energy appeared before the National Energy Board in the following proceedings:

May 1981 – Trunk pipeline expansion between Brampton and Burlington by TransCanada PipeLines Ltd.

The ministry supported the project as improving security of supply for Ontario but wished to ensure that the construction was done in an environmentally sound way.

July 1981 – Annual application by TransCanada PipeLines Ltd. for approval of rates and tolls

The ministry opposed changing the method of regulation to one which it felt offered less incentive to the company to be efficient.

August 1981 – Hearing on gas costing and pricing

The ministry urged that gas prices reflect economic realities and transportation costs, and that existing customers should not be obliged to subsidize major new transmission systems.

November 1981 – Trunk pipeline construction between North Bay and Morrisburg by TransCanada PipeLines Ltd.

The ministry supported the line because it would improve natural gas service in Ontario and further east, but stressed the importance of addressing environmental matters and procedures.

February and March 1982–Arctic Pilot Project

The ministry participated actively in the NEB hearings on this proposal to ship liquid natural gas into eastern Canada to be regasified and to export an equivalent amount of gas from Alberta. Our concern is that this is neither the most cost-effective nor the most secure method for transporting natural gas from the high Arctic.

March 1982–Phase I gas export omnibus hearing

The ministry stressed the need for long-term assurance of natural gas supplies for Canadians and opposed proposed relaxations of the rules for determining the exportable surplus, if any, of natural gas in Canada.

EXPANDING NATURAL GAS DISTRIBUTION

To enable more homeowners and businesses to convert from oil to natural gas, the Ministry of Energy and Energy, Mines and Resources Canada are working to expand Ontario's natural gas distribution system into areas that are not yet served because of high costs.

In March 1981 the federal government announced $15 million in assistance to Ontario utilities for improving and expanding natural gas distribution systems. Further discussions are scheduled to seek a more ambitious program for the fiscal year 1982–83.

Propane

The ministry supports propane as a commercially viable substitute for heating oil and gasoline and has made supply and demand forecasts to determine whether any actions are required to maintain propane's advantageous cost position.

Propane has yet to assume a significant portion of the traditional heating markets in Ontario, although it is in abundant supply. The majority of Canadian propane is exported to the United States.

To encourage propane use for home heating, the federal government, through the Canada Oil Substitution Program, includes oil-to-propane conversions among its grants.

In addition to heating uses the Ontario government has been promoting propane in the transportation sector (see the Conservation and Renewable Energy Sections for details). Many observers believe that with aggressive promotional programs the transportation market may be capable of using a significant portion of current propane exports.

Coal and lignite

Ontario, a major coal consumer, accounts for about half of Canada's total consumption and relies entirely on outside sources for its supply.

However, Ontario does have approximately 150 to 160 million tonnes of recoverable lignite at Onakawana in the James Bay lowlands.

Lignite is a low-carbon coal characterized by a higher moisture content and a lower heating value than other coals such as bituminous.

In partnership with Onakawana Development Ltd., Ontario Hydro examined the feasibility of developing a lignite mine and using the low-grade coal to fuel a generating station on site.

In January 1982 Ontario Hydro announced it would not go ahead with a lignite-fired minemouth generating station at Onakawana because studies showed the project would not be economically attractive when compared to other alternatives such as nuclear or hydraulic generation.

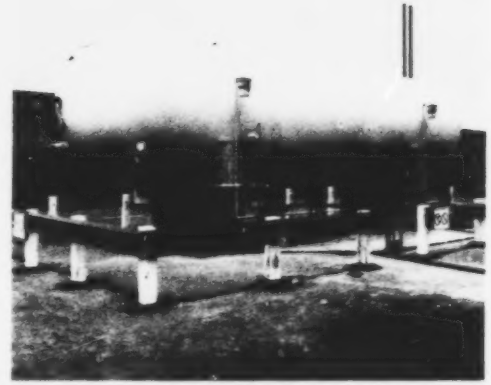
In light of Ontario Hydro's decision, the ministry began a review of alternative uses for lignite, such as solid fuel applications in industry and liquid fuel for transportation. Lignite could play an important role in the ministry's $75 million Alternative Transportation Fuels Program and the ministry is reviewing a number of proposals for the production of synthetic liquid fuels from lignite.

The Ontario government encourages private companies to explore for minerals in the James Bay lowlands, either alone or in joint ventures with the Ontario Energy Corporation. The latter, which has a licence to explore for lignite, concluded its first year of drilling activities in October 1981 with encouraging results.

Peat

Peat is a geologically young coal formed from decaying vegetation such as ferns, grasses and other bog plants. The top fibrous layer is commonly used for horticultural purposes. When properly dried, the lower layers of more decomposed and condensed peat will burn as efficiently as coal.

Ireland, Finland, the USSR and other countries have used peat as a fuel source for several years and have made impressive strides in perfecting the mining and production processes.



Propane, stored in tanks like this, is among the fuels included in the Canada Oil Substitution program (COSP).

In October 1981 the Ontario government released the first definitive study on the extent and possible uses of the province's peat reserves: *Evaluation of the Potential of Peat in Ontario: Energy and Non-Energy Uses*. The study estimated that Ontario has the third largest peat reserves in the world with an energy potential roughly comparable to Canada's estimated natural gas reserves. About 100 000 square kilometres exist south of the permafrost with an energy content equivalent to about 4 billion cubic metres of oil. However not all this peat is economically recoverable for energy purposes.

The report also identified several uses for peat including small- and large-scale peat production for residential and non-residential space heating, industrial process heat and small-scale power generation. In northern Ontario, community-based projects could provide enough peat to replace up to 80 per cent of the heating oil now used.

The Ministries of Energy, Natural Resources and Northern Affairs, in conjunction with the Canadian National Committee of the International Peat Society, hosted a world symposium on the energy and non-energy uses of peat in Thunder Bay in October 1981.

More than 240 delegates and 30 speakers from countries such as New Zealand, the Republic of Ireland, Finland and the Federal Republic of Germany participated in the two-day conference. The proceedings are available from the Canadian National Committee of the International Peat Society.

To encourage development of Ontario's peat resources the government is establishing an information program to educate consumers on the various uses of peat, continuing detailed surveys of our peat resources and formulating a development strategy for the role of peat in Ontario's energy future.

Uranium

The past year marked the first time Ontario Hydro produced more electricity from nuclear generating stations than from other sources. Nuclear energy provided 33 per cent of the electricity consumed in the province, compared with 31 per cent from hydroelectric stations and 28 per cent from fossil-fuel-powered stations. (The balance is made up of purchases from interconnected utilities.) By 1991, more than half the electrical energy produced in the province will be generated from uranium, resulting in significant increases in nuclear fuel requirements.

The ministry monitors trends in the supply, demand and pricing of uranium both in Canada and on international markets.

Currently, over 60 per cent of Canada's mineable uranium resources are in the Elliot Lake and Agnew Lake areas of Ontario. Ontario Hydro has contracts with several Elliot Lake companies to supply uranium for the next 30 years.

At the same time Ontario Hydro continues to be involved in uranium exploration directly through joint ventures with Norcen Energy Resources, Amok Ltd., Shell Canada Resources Ltd. and Canadian Nickel Co. Ltd.

Electric power

Electricity supplies more than 15 per cent of Ontario's energy needs. It is a secondary energy source produced from primary sources such as oil, natural gas, coal, uranium or water-power.

In 1981-82 electricity produced from uranium (nuclear) and water-power (hydraulic) made up about 64 per cent of Ontario's electrical supply.

Response to the Porter Commission

In 1977 the Ontario government established the Royal Commission on Electric Power Planning, chaired by Dr. Arthur Porter, to examine Ontario Hydro's long-range plans for the period 1983 to 1993 and beyond.

The Commission published its final report in 1980. In June 1981 the government released the Response of the Government of Ontario to the Royal Commission on Electric Power Planning, co-ordinated by the Ministry of Energy.

The response addresses each of the Commission's recommendations and offers comments and suggestions regarding their implementation. Copies are available from the ministry free of charge.

BILDing Ontario electrically

In early 1981 the Ontario government's Board of Industrial Leadership and Development (BILD) made electricity a pillar of the government's economic and industrial expansion program.

BILD policy calls for accelerating the completion of the Darlington nuclear station. In April 1981 Ontario Hydro accelerated the in-service dates of the first two units by six months each and the last two units by twelve months each.

Other BILD initiatives include constructing and upgrading transmission and distribution facilities. Another thrust encourages electricity for home heating, public transit and greater use in business and industry. To promote more efficient use of electricity BILD promotes off-peak use and thermal storage.

Hydrogen

Ultimately electricity can be used to produce hydrogen by separating it from the oxygen in water. A key BILD initiative in 1981/82 was the allocation of $10 million towards creation of the Institute for Hydrogen Systems in Toronto. (For more information on the potential of hydrogen as a transportation fuel, see the Alternative Transportation Fuels Program in the Renewable Energy Section.)

Fusion

On March 31, 1982, the Ontario government, Ontario Hydro and the National Research Council of Canada signed an agreement under which Ontario will use its expertise to develop technologies to process, handle, store and transport the fuel that will be used in early generations of fusion reactors.

The BILD program, Ontario Hydro and the ministry will contribute half of the $1.5 million funding in fiscal 1982/83. The National Research Council will contribute the remainder towards this National Fusion Program.

Existing nuclear fission reactors use the energy released when uranium atoms split. Fusion energy systems will use the energy released when hydrogen atoms are joined or fused. The fusion of one gram of hydrogen releases ten times the energy of the fission of one gram of uranium.

The project, to be managed by Ontario Hydro, will focus on the long-term involvement of industry, research agencies and institutions in the development of nuclear fusion in Canada.

Ontario Hydro to sell steam

The Ontario Legislature passed amendments to the Power Corporation Act in June 1981 allowing Ontario Hydro to sell steam and hot water on a similar basis to electrical power.

As a result, industries near Ontario Hydro's thermal stations can purchase steam produced from these stations at a lower cost than from alternative steam sources.

In 1981/82 the BILD program funded the first stage of steam lines from the Bruce Nuclear Power Development to the Bruce Energy Centre, an adjacent industrial park.

Grid extensions to isolated industries

In September 1981 the treasurer of Ontario, as chairman of BILD, announced that the province would aid in the construction of a new 17.6 km., 44 kV line from Madawaska to upgrade the electrical supply to the McRae Mills sawmill near Whitney. This will complement the existing fully loaded 12 kV line and enable McRae Mills to reduce its dependence on oil and expand operations. The estimated cost of construction is $650 000.

As a result of a recommendation from the ministry, BILD awarded $332 000 for more than half of the project cost. McRae Mills will contribute $100 000, and the remainder of the costs will be assumed by Ontario Hydro. All costs at the mill itself will be borne by McRae Mills.

The project addresses two objectives of the BILD mandate. It reduces an industry's dependence on oil (350 000 litres of diesel oil annually will be saved) and creates jobs (10 new permanent jobs will be created at the mill and 150 existing jobs maintained). These jobs were in danger if the mill had to continue operating on high-priced diesel generation.

New transmission lines

The Royal Commission on Electric Power Planning recommended that Ontario Hydro should plan alternative routes for a second 500 kV transmission line from the Bruce Generating Station and that the public should have opportunities to be involved in locating these facilities.

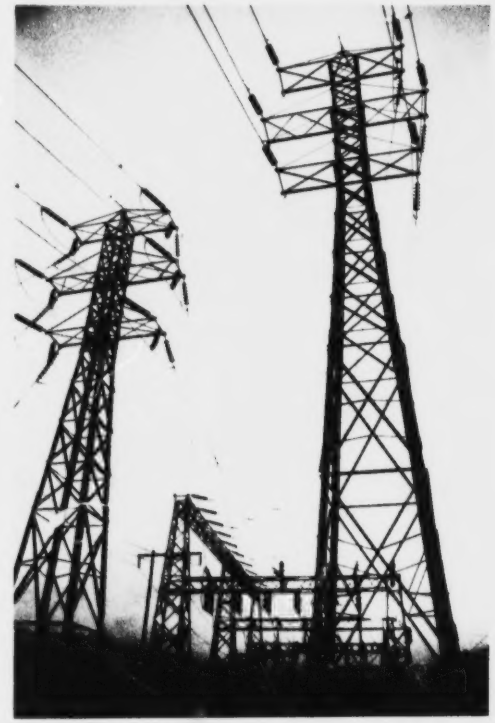
In November 1981 Ontario Hydro filed an environmental assessment with the Ministry of the Environment proposing six alternative routes for additional bulk power transmission facilities in southwestern Ontario.

Hearings for the southwestern Ontario transmission plans before a Joint Hearing Board established under the Consolidated Hearings Act began on January 5, 1982.

As part of the environmental assessment process, the Ministry of Energy reviewed the Southwestern Ontario Plan Stage Environmental Assessment filed by Ontario Hydro.

This review, supporting the need for transmission facilities, was made available to the Hearing Board as part of an overall government review. The ministry also appeared before the Board to reiterate its support for the transmission facilities.

When the Board decides, Hydro will then prepare detailed route studies, and a second public hearing will be conducted.



Electrical power travels across Ontario on 500 kilovolt transmission lines. Ontario Hydro is planning another such line from the Bruce Generating Station at Kincardine.

Ontario Hydro had earlier filed an environmental assessment with the Ministry of Environment requesting approval for one of five transmission routes to eastern Ontario. Public hearings on this application before the Joint Hearing Board also commenced on January 5, 1982.

The Ministry of Energy also prepared a review supporting the need for transmission facilities in eastern Ontario and supporting planning for additional interconnection facilities with Hydro Quebec. The ministry was to appear before the Board to speak to the review.

Exporting electricity

The Ministry of Energy supports Ontario Hydro's efforts to maintain existing power export markets and gain access to new markets in a manner consistent with Ontario government policy.

1981 RENEWAL OF EXPORT LICENCE

On June 19, 1981, the National Energy Board approved Ontario Hydro's applications for:

- a licence permitting Hydro to export up to 25 000 GWh of interruptible electricity in any 12-month period from July 1, 1981, to June 30, 1991; and
- a licence to export up to 1200 MW of firm power in terms from six months to five years, from July 1, 1981, to June 30, 1991.

Ontario Hydro also applied for and received a certificate authorizing the upgrading of the transmission line connecting Ontario and New York at Niagara Falls.

EXPORTS FROM J. CLARK KEITH STATION

In May 1981 Ontario Hydro sold 254 MW of firm power to General Public Utilities for a period of three years.

This sale will require the use of transmission line facilities belonging to utilities in Michigan and Ohio. An agreement for the transmission of this power was accordingly negotiated between Ontario Hydro and the Toledo Edison Company, which represented the intermediate utilities.

After a review by the Ministry of Energy, the agreements were ratified by Order-in-Council on July 8, 1981.

As a result Ontario Hydro will be able to export the total output of the J. Clark Keith generating station in Windsor over the next three years. This station would otherwise be shut down because its output will be surplus to Ontario Hydro requirements over this period.

EXPORTS TO VERMONT PUBLIC POWER

In November 1981 Ontario Hydro negotiated a contract with the Vermont Public Power Supply Authority for the export of firm power over a three-year period – 16 MW in the year ending October 1982; 18 MW in the year ending October 1983; and 20 MW in the year ending October 1984. This would replace an existing contract for 12 MW of short-term power with the same utility.

After review by the Ministry of Energy, this agreement was approved by Order-in-Council in December 1981.

LAKE ERIE CABLE PROJECT

On November 9, 1981, Ontario Hydro and General Public Utilities of Pennsylvania and New Jersey signed a Letter of Intent regarding the construction of an underwater cable connection across Lake Erie for the purpose of exporting 1000 MW of firm power to General Public Utilities over the period 1985 to 1995.

The project proposed to construct onshore facilities and a 105 km underwater cable link across Lake Erie from Nanticoke, Ontario, to Coho Site, Pennsylvania. The National Energy Board conducted hearings on Ontario Hydro's application for approval of construction of the interconnection and sale of power in January 1982. The Ministry of Energy represented the Ontario government at the hearings. After the end of the fiscal year the National Energy Board approved the project, pending federal cabinet approval.

Since the January hearings the estimate of project costs for laying and embedding of the underwater cable have increased significantly. Consequently in early June 1982 General Public Utilities announced that it would apply to the New Jersey Public Utilities Board for permission to withdraw from the project, citing the increased cost estimate and other factors as the major reasons for this decision.

Power rate increases

On April 15, 1981, the chairman of Ontario Hydro submitted a proposal to the Minister of Energy to increase 1982 bulk power rates to municipal utilities and direct industrial customers. The Minister referred the proposal to the Ontario Energy Board for review.

After conducting public hearings in June and July, the Ontario Energy Board recommended a number of changes to the proposal. The Ontario Hydro Board of Directors accepted all the Ontario Energy Board's recommendations with one exception, which dealt with a proposed debt retirement policy.

The Ontario Hydro Board approved new rates for implementation on January 1, 1982. These rates resulted in average increases of 9.6 per cent for municipalities and 10 per cent for direct industrial customers including the effects of the program for reducing the rural rate differential.

Costing and pricing policy

Following the Ontario Energy Board's recommendation, Ontario Hydro consulted with its customers and other interested parties to develop new costing and pricing policies, including rates that vary with the time of day. These form part of its 1983 bulk power rates package submitted to the Minister of Energy in February 1982. The Minister has referred the entire proposal to the Ontario Energy Board for hearings beginning April 21, 1982.

Rate assistance to rural customers

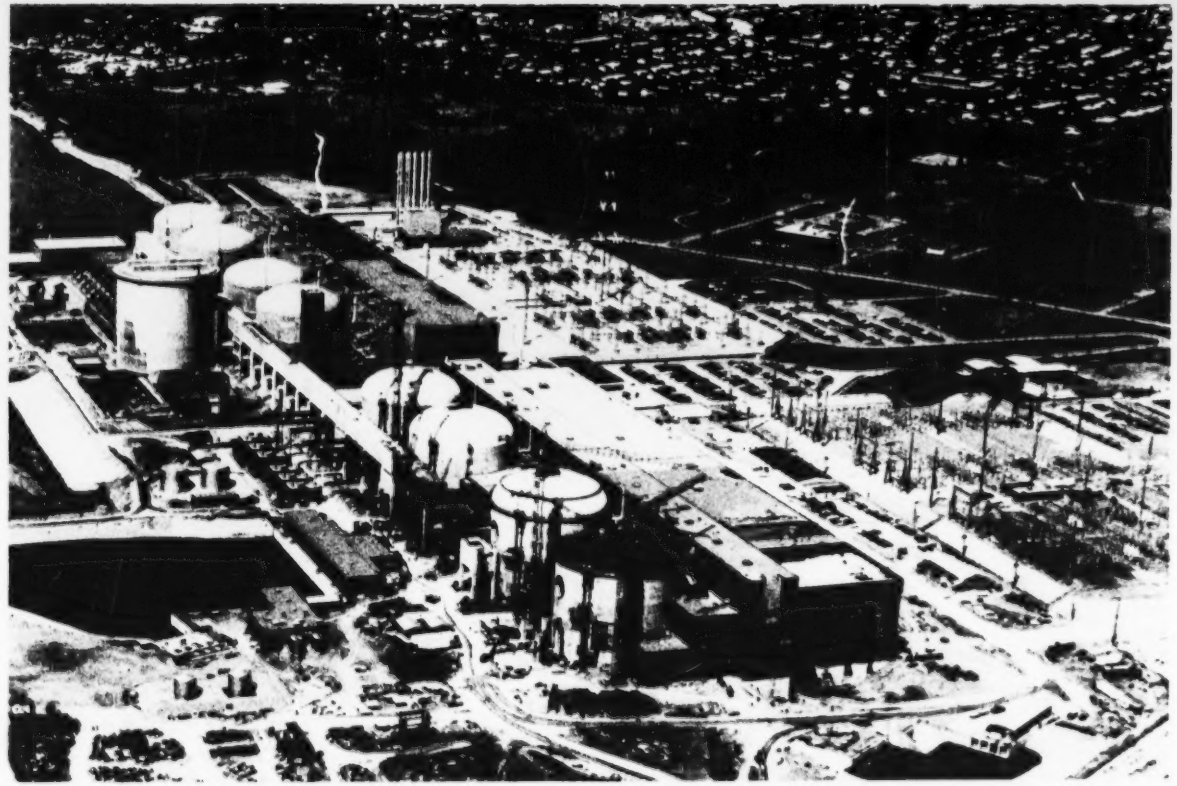
Almost 100 000 of Ontario Hydro's rural customers living near towns have been transferred to municipal utilities over the last five years through the municipal restructuring process, resulting in higher electrical costs for Hydro's remaining 530 000 year-round farm and rural residential customers.

Rural residential customers have historically paid higher electrical rates than municipal customers. But because of the increasing disparity between urban and rural rates the Ontario Legislature passed Bill 141 in October 1981 reducing the differential from approximately 30 per cent to 15 per cent. That is, the rural residential rate was set at 15 per cent above the average municipal residential electricity rate.

Helping homeowners conserve or convert

The amendments to the Power Corporation Act in June 1981 also gave Ontario Hydro and the province's municipal electrical utilities the authority to carry out a residential electrical services upgrading program and include the costs in the charges for electrical service.

The program, called the Residential Energy Advisory Program (REAP), is a prime example of the Ontario government's commitment to the greater use of electricity. The program offers energy advice and loans to homeowners to make their homes more energy-efficient. (For details on this program, see that part of the Conservation Section dealing with the residential sector.)



Nuclear power generating stations, like this one at Pickering, produce over 30 per cent of Ontario's electricity.

Micro-hydro installations can produce up to 20,000 kilowatts of electrical capacity.

Ontario Hydro's rural service customers were the first to be offered REAP's services in September 1981. The program was adopted by some municipal utilities in January 1982 and will cover most municipal customers in Ontario by the end of 1982.

Ontario Hydro established a training centre in Niagara Falls to teach municipal utilities' staff how to carry out the home energy advisory survey. During 1982 the centre will expand to accommodate more municipal personnel and accelerate the program's expansion throughout the province.

Small hydroelectric sites

The Ministry of Energy, along with the Ministry of Natural Resources, encourages further development of hydraulic generating capacity where socially and environmentally acceptable.

Twenty municipal utilities in the province own and operate their own small hydro generating facilities. But there are several hundred more potential hydraulic sites in the province most of which have existing dams now used for flood control, recreation or other purposes.

In some communities, the use of these dams to generate electricity may result in lower power rates.

Hydraulic sites are designated according to their average energy capacity. A 'micro site' describes a location with the potential of generating up to 100 kW of electricity. A 'small hydraulic site' can generate from 100 to 20 000 kW (2 MW) of electrical capacity.

In 1981/82 the government began encouraging private developers and others to assess the many micro and small hydraulic sites throughout the province and install hydroelectric generating facilities.

In May 1981 the Ontario cabinet approved a policy that puts Ontario Hydro, private developers and public utilities on an equal footing when seeking permission to develop these sites. Ontario Hydro used to have first right of refusal on developing all hydraulic sites.

Also in May the Ministry of Energy announced a policy allowing municipal utilities and other interested parties to bid directly for the lease of crown-held sites with a generation potential of less than 2 MW.

Local community initiatives are already appearing. Private developers in St. Jacobs installed a 100 kW generating facility at the E.W.B. Snider mill. Work on this project began prior to the government's policy announcements. The initiative and experience of this group may prove to be a worthwhile example to others.

In 1981 the ministry published a micro-hydro booklet for individuals interested in water power. It describes the government approval process and available equipment, lists manufacturers and discusses costs and economics. Almost 2000 copies were sold, and a revised edition was issued in March 1982.

In co-operation with local municipalities and other government agencies the ministry is demonstrating micro hydraulic technology that could be applicable to remote communities. (For more information on these demonstrations refer to the Remote Power Systems Program in the Renewable Energy Section.)

In 1981/82 the ministry also undertook studies to analyse the problems municipal utilities, conservation authorities and private interests have encountered in developing small hydro sites. These studies should help the province overcome these constraints and facilitate small hydroelectrical developments.

With Ministry of Energy support the Ministry of Natural Resources conducted a province-wide inventory of small hydraulic sites and prepared a manual for the assessment of sites.

Approximately 230 sites have been assessed. (This program will continue next year with the assessment of another 100 sites or more.) The best of these sites will be offered for lease to the public.

Streamlining of the approval process for small hydro began in 1981/82 and will continue next year.

Remote areas

Ontario Hydro supplies electric power to certain northern Ontario communities not served by the existing transmission and distribution grid system. This is carried out under a $3 million program for the Electrification of Remote Northern Communities announced in December 1976.

Hydro provides local diesel generation, small hydraulic generation or extensions to existing transmission lines where appropriate initial capital costs are paid by the government.

Since 1976 five communities–Hillsport, Oba, Armstrong, Biscotasing and Sultan–have benefited from a dependable electricity supply. Another three communities–Collins, Audin and Ramsay–are being surveyed for inclusion over the next two years.

In 1981 the service at Sultan was augmented with the installation of a 'mini-hydel' hydraulic generating unit. This unit, the first of its kind to be installed in a remote area, will be used to supply power to the Sultan system whenever hydraulic conditions permit. The diesel units will remain in place as a back-up system and for use during low-water conditions.

Nuclear Fuel Waste Management Agreement

On August 4, 1981, the Ontario and federal governments gave Atomic Energy of Canada Ltd. approval to conduct field research drilling on provincial crown land at East Bull Lake, 35 km east of Elliot Lake, and Overflow Bay/Denmark Lake, 75 km southeast of Kenora.

This geotechnical research will assess the appropriateness of using granite-like rock formations for permanent disposal of radioactive wastes from nuclear power stations. The research does not involve radioactive waste, nor are these research sites being evaluated as potential waste disposal sites.

Nuclear waste disposal research is part of the Canada-Ontario Nuclear Fuel Waste Management Program and has been under the direction of Atomic Energy of Canada Ltd. since the program's inception in 1978.

The two governments also agreed on the roles and responsibilities of their agencies in the process of reviewing the research results. First, a thorough technical and environmental review will use federal and provincial regulatory and review agencies, universities, an independent technical advisory committee (comprising representatives of several professional scientific associations) and other consultants.

When this process is completed by the late 1980s, there will be full public hearings under the auspices of the federal government.

The process of selecting a disposal site for nuclear fuel wastes will not be initiated until after this public hearing and approval by the two governments.

Renewable energy

Overview

As crude oil supplies are depleted and the cost of finding and processing new supplies escalates, renewable energy becomes more attractive as a supplement to conventional energy forms.

Undoubtedly Ontario will in the long term move towards an energy mix based increasingly on renewable and essentially inexhaustible sources of energy such as water-power, energy from waste, solar energy, wind power, nuclear fission and fusion and more advanced forms of energy such as hydrogen.

Before reaching that stage, however, practical economic alternatives have to be developed. Technologies must be perfected and applications must be tested and demonstrated. In this way Ontario will become capable of making increasing use of renewable forms of energy as these become cost competitive.

The Renewable Energy Program within the ministry was created in 1979 to investigate, develop and demonstrate alternatives to conventional energy systems in the residential, commercial, industrial and transportation sectors.

The program seeks to accelerate the market penetration of such alternatives in line with broad provincial objectives. The emphasis is on improving cost competitiveness and acceptability to the user as well as fostering private sector involvement in the development, supply and marketing of alternative energy systems.

Significant progress has already been made in improving the performance, reliability and cost-effectiveness of many renewable energy systems. The most obvious examples are industrial wood waste systems, residential wood heating, passive solar systems for energy-efficient housing, industrial and commercial solar process preheating, and propane and compressed natural gas in transportation.

By funding a variety of demonstration projects the ministry also encourages private sector involvement in new energy industries, job creation, technology refinement and market development.

The years 1981/82 marked a turning point in renewable energy activities as the ministry moved from a research and development approach to a concentration on practical applications of new technology. Demonstration projects under way involve propane, compressed natural gas, passive solar energy, and municipal waste burning systems.

Breakthroughs in commercialization are especially difficult in the recent economic climate of high interest rates and the need for government fiscal restraint. Consequently the ministry is launching a Technology and Program Assessment project which will ensure that efforts are focused in those areas where commercial breakthroughs seem probable.

Looking to the future, the Renewable Energy Program will concentrate on eliminating barriers to commercialization of demonstrated technologies while continuing to support the development and demonstration of emerging technologies.

Solar energy

Here comes the sun

Solar energy has been used for thousands of years. The early Greeks and Egyptians constructed passive solar architecture. By the late nineteenth century, French and American inventors had built the first solar-powered engines and industrial plants.

Discoveries of cheap and readily accessible coal, oil and gas interrupted the refinement of early solar technology. But these dwindling, and now expensive, resources are the same reasons solar energy is enjoying a rebirth today.

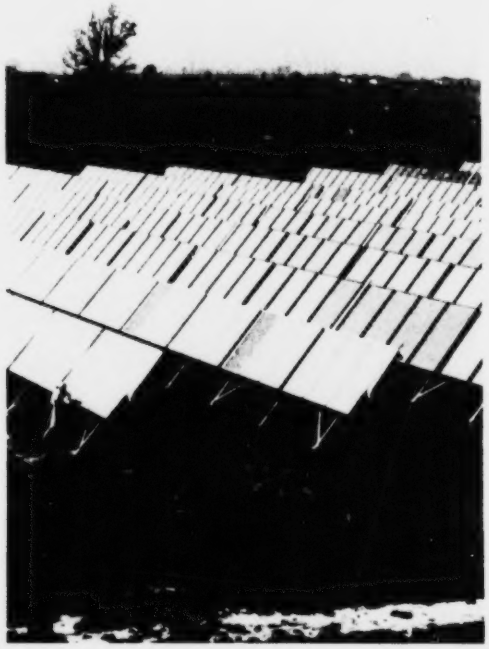
Thanks to significant technical improvements over the past five years, homeowners, commercial firms and industries are starting to heat again with solar energy.

One obstacle to solar energy's common use is the belief that it is expensive. In fact, when calculated over the expected 20-year life of a standard solar system, solar energy compares very favourably in some applications with conventional heating systems.

The major economic factor inhibiting more widespread installation of solar facilities is the cost of borrowing money, which currently exceeds the rate of inflation of conventional energy costs.

A key challenge facing government and industry is to find innovative ways of financing which recognize that a solar system's capital costs are all incurred in the first year. After this, fuel, operating and maintenance costs should be minimal.

Ontario companies involved in design, manufacturing and installation of solar equipment made impressive strides in the past year. Many have developed capabilities in a range of solar products from the basic flat-plate collectors to complete ready-to-



Solar panels at Mohawk Hospital, Hamilton are a source of hot water for the institution's huge laundry facility.

install packaged systems and photovoltaic devices and systems. Others began to actively pursue overseas markets.

These Ontario firms now dominate the Canadian solar industry (manufacturing about three-quarters of the solar products made in Canada), generate more than 400 jobs and in 1981 accounted for sales of almost $20 million.

As an added bonus the industry is labour-intensive. Studies show the Canadian solar industry could create 65 000 jobs (the majority unskilled) in the next ten years.

Residential passive solar systems, solar-heated swimming pools and industrial process heat systems are the strongest competitors to conventional energy sources. Almost all solar-heated outdoor swimming pools recover their capital costs within five years. Increased production and a rapidly developing technology may enable some commercial and industrial systems soon to achieve a 10-year payback period.

The ministry supported the installation of over 100 active solar systems in 1981/82 both financially and technically. Interest from the private sector and the solar industry has increased as information circulates about design, installation, commissioning and operating experience.

Much of Ontario's progress and leadership in the solar field in recent years centres on our knowledge of the best applications for solar technology. Industry is finding new uses for solar thermal systems that collect, store and deliver heat economically.

The Ministry of Energy focuses its solar program efforts in two areas—developing a mature solar industry in Ontario capable of manufacturing reliable, cost-competitive products, and providing the initial markets for these solar products within the province.

The cost of photovoltaic systems, which generate electricity directly from sunlight, is expected to fall tenfold by 1990. Experts predict a greatly expanded market—over $1 billion worldwide—for photovoltaic devices by the end of the decade. This market will involve primarily special applications in remote areas and developing countries.

Helping to develop the market

The ministry's five-year, $10 million Commercial Industrial Solar Demonstration Program is the first government attempt anywhere in Canada to encourage the private sector to find its own markets.

By funding demonstration projects with the private sector and assisting in the exchange of information, the ministry helps Ontario's solar industry improve the technologies and make the contacts that will boost solar product sales at home and abroad.

Thirty Ontario companies received cost-sharing grants worth almost $2.5 million in the first year of the Commercial/Industrial Program. Out of 51 active solar systems funded, 32 were operational by the end of March 1982.

Solar applications demonstrated the first year included both air systems for drying and space heating and hot water preheating for a bakery, a bottle-washing operation, concrete-block drying, a hospital's central laundry facilities, a photo-finishing plant, a gelatine capsule manufacturing plant, motel laundries and swimming pools.

Nine Ontario solar manufacturers supplied the solar equipment and services for the installation of approximately 5400 square metres of collectors.

In February 1982 the ministry allocated $2 million for the second phase of the program to be co-funded by the federal government.

Future emphasis will be on systems and applications that are closest to becoming economic in the near future. As was the case in the first year, a portion of the funds will be reserved to finance solar systems in buildings operated by municipalities and religious, charitable and non-profit organizations.

Solar demonstrations in the public sector

Installing commercial-size solar systems in Ontario government and institutional buildings benefits both industry and users. The government provides solar companies with a public sector market for their equipment and an opportunity for high-profile demonstrations. In return the solar systems reduce conventional energy consumption.

By fall 1982 Mohawk Regional Hospital Laundry in Hamilton will be using the largest active solar system in Canada to preheat 585 000 litres of water every day. Four Ontario solar manufacturers supplied 2000 square metres of collectors for the project, which is several times the size of any other system in Canada.

Mohawk is an excellent example of a cost-effective system for commercial establishments that use large amounts of hot water on a regular basis. The Ontario and federal governments contributed $1.2 million to the installation of the system, which will save the equivalent of about 4000 cubic metres of oil during its expected 20-year life.

Beginning in 1981/82 Ontario municipalities became eligible for grants of up to 90 per cent of the cost of installing solar domestic hot water systems in non-profit housing projects. The Ministry of Energy set aside $1 million over the next five years for this program in the belief that solar energy can substantially cut heating costs and find a wide application in high-density housing projects. This program is being managed by the Ministry of Municipal Affairs and Housing.

Similarily, an Ontario Housing Corporation apartment building in Toronto began using a solar hot water system that should save 20 to 30 per cent in water heating costs. This installation marked the first time a solar hot water system was added onto an existing apartment building of this size (99 units) in Ontario.

Residents of northern Ontario can also use solar energy effectively, as will be shown by a solar-heated indoor swimming pool at the new Dryden aquatic centre. Solar collectors will be mounted on a wall at a 60-degree angle facing south to avoid snow loading and roof leakage problems. The system should provide between 30 and 50 per cent of the energy required to heat the pool's water.

Solar energy also heats the water for showers, laundries and other facilities at 10 provincial parks. The 13 systems installed in 1981 operated so successfully in northern and southern Ontario parks that more installations are planned for the summer of 1982.

The Ministry of Energy funds other demonstration systems through the Ministries of Municipal Affairs and Housing, Health, Education, and Correctional Services. In 1982/83 a multi-year program to identify and develop solar applications in government buildings will be initiated with the Ministry of Government Services.

Cost and performance data

Interested individuals can obtain monthly monitoring reports on 16 of the 25 solar installations now operating in Ontario government buildings. Project summaries of all the active solar system installations in government and commercial/industrial sites are being prepared for release in 1982/83.

During the year the ministry also published a 31-page consumer booklet for owners of small residential swimming pools, showing them how to conserve energy and use solar heating.

Passive solar homes

The ministry strives to make more and more builders and home buyers familiar with low-energy, passive solar design techniques because these features are both reliable and increasingly cost-effective.

In co-operation with the federal government, the Housing and Urban Development Association of Canada (HUDAC) and Ontario Hydro, the ministry funded the energy efficiency and passive solar aspects of several homes designed and constructed by private developers in 1981.

New subdivisions in Chatham, Collingwood, Ottawa, Petrolia and Toronto each boast one or more of these passive solar homes with potential annual energy savings ranging between 30 and 65 per cent. All the houses are being monitored for two heating seasons to gather data on their actual performance.

In November 1981 the ministry and HUDAC conducted a seminar at the Ontario Science Centre in Toronto for 400 members of the building industry and the general public to exchange information on their experiences and practices in low-energy, passive solar housing. Two reports on the design and construction aspects of the original demonstration program were distributed at the seminar.

More programs are planned for 1982/83 to help make low-energy, passive solar housing a standard building practice. These include demonstrations of entire subdivisions, a promotional campaign aimed at builders and prospective home owners, and a training seminar on construction techniques for builders and related trades.

The Ministry of Energy funded a demonstration of solar heated water at rest stations in provincial parks.

Residential Domestic Hot Water Program

The ministry and Ontario Hydro are examining equipment and installation methods and procedures for solar domestic water heating packages. As part of this program, 50 domestic hot water systems are being installed in homes province-wide.

While these systems can be attractive in areas where energy costs are high, further work on thermosyphon, freon and heat pump systems and on general system improvements needs to be done to develop economic options for Ontario.

Solar technology in agriculture

Using the sun to heat barns and machine sheds and to dry grain are only some of the potential new applications solar energy may enjoy on the farm.

The Ministry of Energy, through the Ministry of Agriculture and Food, sponsors research projects at the University of Guelph which explore ways of using solar energy to help offset farmers' energy costs, including systems a farmer can build himself.

Greenhouses at Concord and Vineland tested acrylic, double-glazed windows to cut down heat loss and a computer-based control system for heating, ventilation, humidification and lighting in groups of greenhouses.

Technological and industrial development

To improve its competitive position Ontario's solar industry must overcome economic and institutional barriers, refine the technology even further, improve equipment and expand sales.

Work is continuing to determine the most efficient and profitable applications for solar technology in Ontario. For example, photovoltaic systems are becoming increasingly competitive with conventional sources of electricity in remote areas. The ministry is exploring the technical and industrial opportunities arising from this situation to ensure that the Ontario solar industry benefits fully from expanding photovoltaic markets. Our programs continue to emphasize near-term commercial viability.

With the ministry's help, the Solar Industries Association is working to remove building code barriers to solar energy development and establish standards for domestic hot water systems.

In 1981–82 Ontario's solar companies exported 20 per cent of their production, primarily flat-plate collectors and thermosyphon systems, to areas in the United States, the Middle East and East Africa.

To expand on this market, the ministry and the federal government co-operated in arranging overseas export seminars and export missions. New export markets and strategies for all Ontario-manufactured solar products are being explored.

Energy from waste and biomass

For centuries societies recycled much of their waste because it was too valuable to discard. But the industrial revolution, fuelled by cheap energy, made it more practical in many instances to throw away items than to repair or reuse them. In this practice, however, societies were discarding a lot of the energy invested in waste and using even more energy to dispose of it.

Today, waste recycling makes more efficient use of depleted resources, and as an energy source waste is often a viable substitute for conventional fuels.

In Ontario the Ministry of Energy is working on a 15-year, $3 billion Energy from Waste Program to convert some of the millions of tonnes of waste generated in the province each year into useful energy.

The program concentrates on three areas—municipal solid waste, wood and forest products waste and agricultural waste and biomass. (Biomass denotes renewable organic matter generally, and plant matter in this context.)

The ministry expanded activities substantially in this second year of the program. Over 100 projects are now at different stages of development, and during the year many projects moved into the implementation stage.

Financial and operational risks are inherent in any new technology. The government's role is to alleviate these risks and encourage private sector investment by proving that an energy from waste and biomass industry can operate efficiently and economically in Ontario. As a result, numerous demonstration projects sponsored by the ministry are now under construction or in operation in Ontario.

To showcase the operating successes and investment opportunities and to explore future directions, the ministry will host ENERGO '83, a major energy from waste and biomass conference in Toronto on the theme 'Ontario Energy Opportunities in Biomass,' in March 1983.

Municipal solid waste

The idea of burning garbage to produce energy–steam and or electricity–originated in Europe after 1945 when limited disposal space and historically high oil prices made heat recovery from incineration an attractive proposition.

Ontario's experience to date with these systems is limited. Only one municipal solid waste plant is built and operational–Tricil SWARU (Solid Waste Reduction Unit) in Hamilton. Yet Ontario also has a shortage of available landfill sites, and virtually all household garbage can be incinerated.

Burning one tonne of garbage produces the heat equivalent of 1.1 barrels of oil, and approximately 6 million tonnes of municipal garbage are generated annually in Ontario. Heat recovery incineration of this household waste could produce useful energy while reducing the volume of the waste requiring ultimate disposal by up to 80 per cent.

The most widely used process and also the simplest is to burn garbage in boilers that heat water to produce steam. This steam can either be used directly for heat or made to drive turbines and produce electricity.

The ministry's energy from waste program seeks to help get a number of municipal solid waste plants built and operating in major Ontario centres by 1995. Three steps are involved: a feasibility study to determine whether local garbage can be economically converted into energy, more detailed project development including environmental assessments and financing arrangements, and plant construction.

The financing and institutional arrangements are becoming the most important considerations. There is little past experience in Canada to draw upon for funding these projects. The investment decision process is very complex, and municipalities and government agencies are exploring the legal, financial, environmental and institutional issues which form part of the negotiating process with equipment suppliers and private sector operators who are interested in owning and operating such facilities.

The ministry commissioned a financial study to determine what the principal barriers are to constructing these facilities and whether fiscal incentives are needed to encourage an energy from waste industry in Ontario.

Putting municipal waste to work

Victoria Hospital in London could meet all its heating needs and about one-third of its power needs with steam produced by burning all that city's household garbage every day. The Hospital Corporation is proceeding towards an environmental assessment of the project with financial assistance from the ministry. Negotiations are also under way to determine the most equitable method of financing the project to distribute the risks and benefits among all parties involved.

Once these stages are completed it is expected that plant construction will begin. By mid-1985 London's household garbage could heat London Victoria as well as other nearby hospitals, saving millions of dollars in landfill and conventional energy costs over the life of the project.

The St. Catharines General Motors plant and the Ontario Paper Company in Thorold are two potential customers for energy from waste facilities in the Niagara area. Since there is waste enough to fuel only one plant, the two municipalities must reach a decision on which plant should be supported. Interested private sector investors are preparing a detailed proposal for one plant's operation in the Region of Niagara.

In Toronto, a decision on a location for a refuse-fired steam plant to serve the existing downtown district heating system is expected shortly. While both options–the R.L. Hearn plant conversion and the City of Toronto refuse-fired steam plant–appear viable, the complexities of financing the large capital costs have meant that project timing is somewhat slower than anticipated.

A number of factors have delayed implementation of Toronto's Commissioners Street energy from waste project as well. The capital costs for this project are relatively small since all the incinerators are in place and a $10 to $15 million investment (instead of approximately $100 million for a new plant) is all that is needed to make the Commissioners Street energy from waste facility a reality.

The ministry is also working with the federal and regional governments to explore the possibility of burning Ottawa's garbage to produce steam for use in government buildings in the Ottawa core area.

One of this year's most significant projects is the new energy recovery system at the Lakeview Water Pollution Control Plant in Peel Region. This installation marks Ontario's first experience with recovering energy from sewage sludge using a fluidized bed

Burning one tonne of garbage produces the heat equivalent of 1.1 barrels of oil. Approximately 6 million tonnes of municipal garbage are generated annually in Ontario.

Ontario's goal is to produce sufficient energy from wood to heat 727,000 homes by 1995.

incinerator at a sewage treatment plant. To help pay for the installation of equipment the provincial and federal governments awarded $350 000 to the regional municipality, which will record several 'firsts' in applying this treatment technology in Canada.

Beginning in 1983 Peel Region will save more than half a million dollars in fuel costs annually by using this system of sludge incineration. Furthermore, transportation costs for the sludge and the necessity of finding disposal sites will be eliminated.

Energy from landfill sites

Methane gas produced from the decomposition of garbage at landfill sites may prove to be another valuable energy source. Recovery of methane eases gas seepage and lowers the risk of explosions. Selling the gas can pay for recovery costs and partly offset the costs of maintaining the landfill sites.

The ministry is studying whether energy from landfill sites in Metropolitan Toronto, Waterloo Region and St. Thomas can be used for heating and industrial purposes. If methane recovery and purification proves technically and economically feasible, methane could become an attractive alternative to more costly fuels in areas containing large landfill sites.

Ontario and Metropolitan Toronto each contributed $10 000 to study the energy potential of the 8 million tonnes of refuse at the Beare Road landfill site in Scarborough.

The study is looking at the quantity and quality of the gas available and ways to extract, purify and transport it. One possibility is to drill wells into the landfill and pump the collected gas through a cleaning facility to the point of end use. Potential customers include the Metro Toronto Zoo, a Metro Parks conservatory greenhouse and a proposed Borough of Scarborough recreation area. Using this technique a small greenhouse on the St. Thomas landfill site has been heated since 1979 by gas pumped from wells drilled into the garbage.

Wood and wood waste

Less then half of each tree cut during logging operations actually makes its way to a lumber, pulp or sawmill. The rest is left as stumps, tree tops, branches and other debris in the forest.

Millions of tonnes of bush residue, along with other wastes produced at the mills, can be converted into energy. Ontario's forest products industry could meet most of its energy needs by using wood waste and forest residue as an energy source.

By mid-1981 the pulp and paper industry alone was more than 40 per cent energy self-sufficient, saving millions of dollars annually by replacing oil, natural gas and coal with energy produced from this debris and from chemical recovery systems.

The Ministry of Energy encourages further private sector investment in wood energy by helping to refine the technology and develop markets for smaller scale systems in the industrial, commercial and residential sectors.

The goal is to produce the equivalent of 2.4 million cubic metres of oil annually—enough to heat 727 000 homes—from wood by 1995.

Putting wood waste to work

In 1981-82 Abitibi Paper used pellets made from waste to fuel the boilers at its paper mill in Iroquois Falls.

BioShell, a subsidiary of Shell Canada, makes 100 000 tonnes a year of these easily transportable, dry 'Woodex' pellets from sawmill waste at a plant in Hearst. Marketing has been so successful that BioShell expects to begin operation of a second Woodex plant in Iroquois Falls in spring 1982.

Hearst has also witnessed the birth of a new Canadian technology. Since May 1981 the Levesque Plywood Mill has saved thousands of dollars in natural gas purchases by using a wood gasifier to convert 27 000 tonnes of wood waste a year into useful energy. Omnifuel Gasification Systems Ltd. of Toronto received $309 000 from the Ontario and federal governments for the project, and following initial adjustments the gasifier has performed well.

At Kakabeka Timber Ltd., near Thunder Bay, wood residue replaced propane this year as fuel for a dry kiln at its sawmill plant in Kakabeka Falls. Ontario and the federal government contributed $116 000 towards the conversion to an automatic wood-burning system, rated at about 5 GJ/hour (about 1.4 MW or 1860 horsepower).

In the public sector the Ontario government identified the Rideau Regional Centre in Smiths Falls and the Kemptville College of Agricultural Technology as prime candidates for conversions to wood heat. Existing sawmills within a 100 km radius of these institutions could supply the feedstocks to replace the natural gas and oil now used by these institutions. Definitive engineering and design work for these projects will begin soon, with the co-operation of the Ministries of Government Services and Community and Social Services.

Grenville Christian College near Brockville expects to save over 319 000 litres of heating oil a year by installing an automatic wood burning system to consume the residue from nearby mills. Construction is under way and commissioning was scheduled for June 1982. The ministry contributed $379 000 towards testing and installation of the system and towards compiling the results for other interested parties.

Harvesting trees for energy

The Ministry of Energy funds research on enhancing the energy content (heat value) of hybrid poplars through genetic breeding carried out by the Ministry of Natural Resources at the Ontario Tree Improvement and Forest Biomass Institute in Maple.

Rapidly maturing varieties of hybrid poplar that can be harvested in cycles of from two to ten years have been developed. One hectare can produce more than 17 green tonnes of these trees annually.

In 1981 the Ministry of Energy compieted a study assessing the feasibility of producing methanol, steam and electricity from wood in the Edwardsburgh area and the prospects for expanded fuel wood markets. Phase One of the study found that 600 000 dry tonnes of wood and wood waste annually are available now at a maximum cost of $50 a dry tonne. Potential hybrid poplar plantations in the area could provide close to another 400 000 dry tonnes at approximately the same cost.

Phase Two found that 130 000 dry tonnes could fuel a 9 MW electricity and steam cogeneration facility that would be cost-competitive with industrial electricity rates in the area. The study also suggests that adapting an existing methanol plant currently using naphtha to burn wood is worth further study.

Heating with wood

In the residential sector the ministry is helping develop technology to make wood a convenient, safe and cost-effective fuel in space heating.

A cord of well-seasoned hardwood contains approximately the same amount of energy as 580 litres of heating oil. Although in many urban areas wood is too expensive to compete even with oil, in rural areas a cord can be bought for $50 to $75. The installation of an efficient wood stove or furnace makes this a very attractive alternative to fossil fuels.

Wood-burning heating systems that reduce oil consumption in a residence by 50 per cent or more are eligible for grants under the federal government's Canada Oil Substitution Program. In Ontario alone over 12 000 conversions to wood have received such grants since the program's inception in late 1980.

Because of safety considerations the rapid increase in wood-burning installations means that equipment certification and site inspection procedures must be examined and accelerated. The province and the federal government are thus reviewing ways to assist householders with the safe installation and conversion to wood heating.

With the co-operation of the Ministry of Natural Resources the ministry completed a survey of residential wood heating in Ontario which estimated that over 1.1 million full cords of fuel wood were burned in 1980 by 800 000 Ontario residents.

As many as 90 000 (or 3 per cent) of households currently use wood as their primary source of heat. Projections indicate Ontario residential fuel wood consumption in 1986 will be almost 2 million full cords.

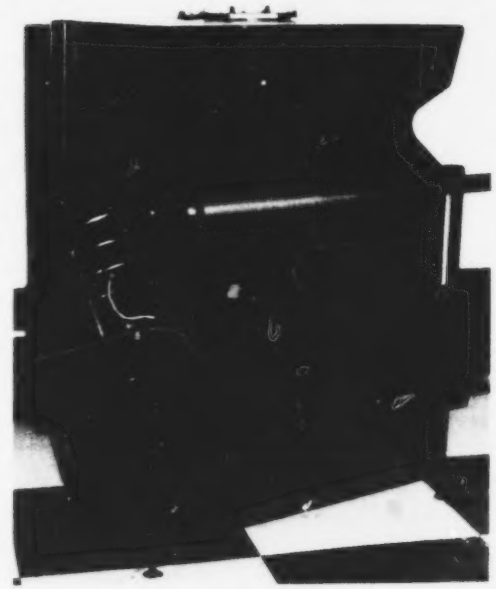
In 1981–82 the ministry funded several other projects in co-operation with the Ministry of Natural Resources to increase the availability of fuel wood for the residential sector. In particular, the ministry provided $340 000 as part of a fuel wood enhancement program, including stand improvement, woodlot tree marking (approximately 20 000 full cords were marked or harvested) and the construction of fuel wood access roads.

The ministry will publish a comprehensive guide to residential wood heating, describing woodburning equipment and costs, in conjunction with the Canadian Wood Energy Institute later in 1982. The Institute is also co-operating with the ministry in sponsoring Woodfire '82, a conference to exchange information on and publicize North American and European commercial and industrial wood uses, scheduled for June 1982.

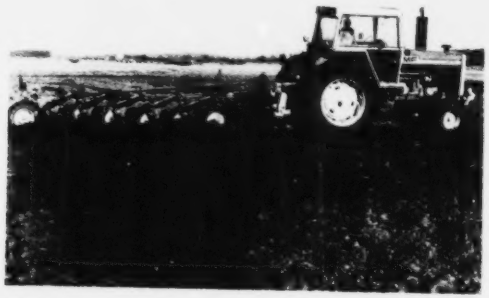
Energy and agriculture

Ontario farmers have long enjoyed cheap energy. In the last forty years it enabled them to adopt large-scale, energy-intensive methods of production that have resulted in enormous increases in productivity.

But in the last decade energy has become a farmer's second-largest operating expense. Crude oil provides half of the energy used in agriculture, and for every dollar spent by farmers on energy today more than 65 cents goes to pay for petroleum products.



Properly installed wood stoves are safe and cost-effective for space heating



This tractor cultivating the Holland Marsh soil uses vegetable oil as a fuel.

In November 1981 the Ontario government's Energy and Agriculture Policy Committee released its findings on the impact of future energy supplies, demand and prices on the agricultural industry. A 20-year strategy for energy management in Ontario was proposed, with emphasis on an in-depth five-year agricultural energy management program.

The Ministry of Agriculture and Food released a companion document, *An Energy Management Strategy for Ontario Greenhouses*, in January 1982.

The Committee found that changes in energy use patterns cannot happen quickly, and no single resource would replace conventional fuels for use on the farm. But with the help of government, valuable foodlands can be preserved, new practices can be adopted, new technologies developed and alternative energy sources can be explored to help Ontario farmers reduce their energy costs.

The Ministries of Energy and Agriculture and Food are developing programs to assist Ontario farmers based on the recommendations of these two documents.

ENERGY CONSERVATION IN AGRICULTURE

In Leamington the ministry is monitoring a system in which three heat pumps extract heat from water at an artesian well to heat a greenhouse. At the Arkell Swine Research Station near Guelph the heat generated in a swine barn is captured by a heat exchanger and used to heat adjacent buildings. And in Woodstock a simple heat exchanger at the end of a corn dryer uses the exhaust warmth to heat the incoming air.

Besides replacing the oil or natural gas now being used, these heat recovery methods are all examples of relatively simple technology which have numerous applications on farms. The corn dryer in particular should recover its cost within three years.

The Ministry of Energy contributed $145 000 to the construction of a new state-of-the-art greenhouse at the Vineland Horticultural Research Institute. One experiment conducted there seeks to circumvent a disadvantge inherent in space heating: when hot air rises some of the energy value is lost by being dissipated ineffectively. The greenhouse will test the efficiency of heating the soil rather than the air. Soil warming systems use far less energy than space heating systems, but their effect on production is not yet established. Extensive monitoring will be carried out after the first crop is planted in May 1982.

To examine the overall energy use pattern on a farm, the farmer needs to know exactly how much fuel is being used in every operation and what conservation opportunities and energy alternatives are available. A farm energy accounting system that will help in making important energy decisions is now being developed. The Ministries of Energy and Agriculture and Food have also assembled a course on energy-efficient farm machinery for a 4-H program to educate young farmers on energy use and costs on farms and possible conservation methods.

ALTERNATIVES TO OIL

A farmer's immediate substitutes for oil are natural gas (where available), propane and electricity. Methane from manure, alcohol from crops, solar heating and biomass burning are longer-term alternative energy possibilities.

Beginning in April 1982 in the Holland Marsh a 6070 square metre greenhouse producing cucumbers will be heated entirely by wood shavings and sawdust from local wood industries. The Ontario and federal governments contributed $150 000 to the installation of the wood-fired boiler. Since the wood waste costs the equivalent of 6.6 cents a litre for oil, the yearly savings are estimated at $40 000.

The Ministries of Energy and Agriculture and Food are also monitoring the efficiency of two biogas digesters which produce methane gas from manure, two farm-scale stills using corn to produce ethanol and the results of an on-farm demonstration where baled straw is being burned in a boiler to heat a farrowing barn and nearby farmhouse.

GROWING ENERGY CROPS

Ontario's marginal land could be used specifically to grow energy crops. Most vegetable material can be processed into liquid fuels which can be used alone or mixed with gasoline in suitably converted farm machinery.

The University of Guelph operated four tractors this year using different blends of vegetable oil and diesel fuel. Further testing is required, but if the engines operate satisfactorily they will show that farmers would only need a crusher to manufacture their own fuel using crude degummed soybean oil, canola (rapeseed) oil or some other vegetable oil.

USING WASTE HEAT TO GROW CROPS

Industrial waste heat can provide another cheap energy alternative if food production facilities can be located near large-volume heat sources such as power stations, steelworks, pulp and paper mills or refineries. Greenhouses are obvious candidates for such sites.

Greenhouse designs, growing techniques and climatic conditions are being examined, with a conventional supply of hot water simulating the temperature and pressure of the supply of hot water that will ultimately be used, at a 4047 square metre site demonstration near the Bruce Nuclear Development as part of the Bruce Energy Centre Project.

Copies of the Energy and Agriculture Report can be obtained for $3.00 from the Ontario Government Book Store, 880 Bay Street, Toronto, or by mail from the Publications Services Section, 5th Floor, 880 Bay Street, Toronto, Ontario M7A 1N8.

Alternative transportation fuels

The transportation sector uses approximately half of all the crude oil consumed in Ontario annually. In addition to its conservation programs, the Ministry of Energy is working to reduce oil consumption by encouraging the development of substitutes for gasoline such as propane, compressed natural gas, alcohol fuels (methanol and ethanol), electricity and hydrogen.

Transportation is perhaps the most difficult sector to convert to alternative fuels. Other than propane and to a limited extent compressed natural gas, there are no substitutes on the market today that are both cheaper than gasoline and easily available to the consumer.

Modern vehicle engines can operate on blends of alcohol fuel with gasoline; gasohol, for example, is a blend of 90 per cent gasoline and 10 per cent ethanol. But there are few vehicles equipped to run solely on alternative fuels except propane. Even where alternative fuels are economically attractive there is some natural market resistance because of public questions concerning safety, reliability, and convenience.

Consequently the ministry funds a broad spectrum of programs with public and private sector corporations di: efining the technology, developing the safety standar s, the obstacles and creating the markets to make n e fuels commercially available and cost-compe gasoline.

In this first full year of the $75 million, five-year Alternative Transportation Fuels Program, the ministry is directing its efforts at developing short-, medium- and long-term substitutes for gasoline and diesel fuel and investigating the potential for an Ontario-based industry to produce alternative fuels from indigenous feedstocks.

In the short term (to 1985) propane and compressed natural gas will be practical substitutes for gasoline, especially for commercial fleet operators. In the short to medium term, the alcohol fuels, especially methanol, are expected to play an increasing role. In the 1990s, many experts feel, electricity and hydrogen may become increasingly important as transportation fuels.

Propane

By the end of 1981 Ontario's commercial fleet operators were converting vehicles to propane at the rate of approximately 1000 a month. If this trend continues, the ministry may meet its goal of displacing 2 per cent of the gasoline used in Ontario by 1985 with propane alone.

To facilitate these conversions, the Alternative Transportation Fuels Program funded the testing of propane conversion kits and propane-fuelled engines carried out by the Ministry of Transportation and Communications as a complement to the highly successful Drive Propane Program.

Compressed natural gas (CNG)

Natural gas is significantly less expensive as a fuel than gasoline. For transportation uses it must, unlike propane, be compressed to high pressure.

The ministry is studying the safety and regulatory barriers affecting the availability and use of compressed natural gas.

Currently only natural gas utilities are franchised to sell natural gas across the province, and a retail network will have to be put in place before CNG is widely available to vehicle operators.

The Ministry of Transportation and Communications and Consumers Gas are examining the operating characteristics, performance and range of CNG-powered vehicles by means of a fleet vehicle demonstration. Further demonstrations of CNG are planned for 1982/83.

Vehicles are being converted to propane power at the rate of 1,000 per month to meet the goal of displacing 2 per cent of the gasoline used in Ontario by 1985.

Methanol

In the medium term (to 1995) methanol will be used to a significant extent in the transportation sector as a gasoline extender and octane enhancer. Methanol contains half the energy value of gasoline, but its higher octane rating enables it to burn more efficiently and hence increase engine performance.

The Ministry of Transportation and Communications is currently testing methanol-fuelled vehicles using blends at different levels to assess winter performance, drivability and long-term engine life.

Methanol produced from natural gas in western Canada is already cost-competitive with gasoline under certain conditions, and the production technology is readily accessible.

However, it would be more advantageous from Ontario's point of view to produce methanol either completely or partially from a provincial resource, provided this can be done at reasonable cost. Consequently the Ministry of Energy is investigating a promising co-production technology for methanol using a synthesis gas produced from Ontario-based resources (wood, lignite or peat) and natural gas.

Methanol produced from indigenous Ontario feedstocks is currently more expensive than gasoline. But realistic projections of future natural-gas-based methanol costs indicate that by 1995, methanol produced solely from lignite, coal, peat or wood will be closer in cost to methanol produced from natural gas in Alberta than at present.

Ethanol

On March 31, 1982, the Ontario cabinet approved a submission under which the Ministry of Energy will fund an Ontario Energy Corporation project to develop a new and more efficient system of producing ethanol from wood waste.

Since Ontario does not have supplies of low-cost grain, sugar cane, beets or other feedstocks traditionally used to produce ethanol, wood is viewed as the prime long-term feedstock when the required technology is developed. The Ontario Energy Corporation has formed a joint venture partnership with Weston Energy Resources (Biohol) to refine this technology, which could make possible highly energy-efficient production of alcohol.

The objective of the $6.5 million, five-year project is to obtain the necessary technical information to construct a pilot plant, which can then demonstrate the technology and determine the production costs.

Electric vehicles

The Ministry of Energy funds tests and demonstrations by Ontario Hydro to assess the performance of electric vehicles under Canadian conditions.

Hydro makes adjustments and improvements as needed to test vehicles, explores potential markets and gauges the expected demand on electricity supplies which could result if an electric vehicle market developed.

With a view to potential private sector investment, the Ministry of Industry and Trade is developing an industrial strategy for manufacturing electric vehicles or their components.

Tax incentives

In 1981 the Ontario government continued to exempt from the provincial retail sales tax licensed vehicles powered exclusively by electricity, hydrogen, propane, natural gas, alcohol or manufactured gas. The government also removed the provincial road fuel tax for alternative transportation fuels whether used alone or in blends with gasoline or diesel fuel.

As an added incentive this year, the province removed the provincial sales tax on propane and compressed natural gas conversion kits and negotiated the federal easing of the bonding and licensing requirements for experimental on-farm ethanol production.

Meanwhile, the federal government announced $400 grants to owners converting new or existing vehicles to propane and a limited number of $600 grants for small fleet conversions to compressed natural gas.

Ontario enters the hydrogen era

In October 1981 the Ontario government's Hydrogen Energy Task Force reported that the development of hydrogen as a new energy form could be as significant as that of electricity was. Hydrogen manufacture does not require fossil fuels, and its combustion produces only water.

Moreover, Ontario is in an excellent position to produce hydrogen by electrolysis with its abundance of fresh water and economical electricity.

As a fuel, hydrogen's chief impact would be in the transportation sector. In West Germany, Daimler-Benz is developing the technology to mass market hydrogen-powered cars. In the United States, the Lockheed Aircraft Corporation is pursuing research and development of aircraft powered by hydrogen, whose high energy content for its weight could be advantageous in aviation.

The Hydrogen Energy Task Force found that hydrogen could be a significant energy form in Ontario as early as 1995 provided it received strong government policy support and the necessary research and development funding.

In November 1981 the ministry signed a contract with the University of Toronto to review and submit recommendations on the establishment of an Institute for Hydrogen Systems. Such an Institute would attract experts from around the world and put Ontario in the lead in developing the systems to produce, distribute and utilize hydrogen.

Remote power systems

Ontario's remote communities have been exceptionally hard hit by high energy prices. As a result the Ministry of Energy has been studying energy supply and demand in such communities in order to identify energy efficiency and oil substitution opportunities in them.

More than 40 isolated hamlets are not connected to the main hydro grid; many rely on diesel-powered generators for their electrical power supply. Where diesel oil is flown in, it can cost five times as much as in southern Ontario.

In developing an overall approach to the energy problems in remote areas, the ministry is determining how much energy is used to generate electricity, what quantity of fuels and power are used in heating, cooking and transportation, and the cost of transporting these fuels.

The next step is to estimate the kinds and quantities of renewable energy sources available within a reasonable distance of these communities. For example, how much wood is available? How many days of sunlight are there? What are the wind speeds? What is the potential for small hydroelectric installations?

Ten remote communities have had such energy audits. The remainder will be studied by the end of 1982-83.

This energy strategy addresses the problems related to the use of non-renewable fuels and supports the use of renewable energy sources, conservation measures and, wherever feasible, the use of cogeneration techniques with existing and future installations. Input from provincial and federal agencies and the local communities is encouraged.

The ministry is testing the feasibility of wind, water, solar and biomass systems in remote areas with the aim of using local energy sources to reduce these communities' dependence on oil and stabilize their energy costs.

At the same time the ministry is investigating the institutional and economic barriers to renewable energy installations in northern communities.

Capturing the wind

The strongest winds in Ontario blow along the edges of large lakes and the islands in those lakes, along the coasts of Hudson and James Bay and in elevated regions across the province.

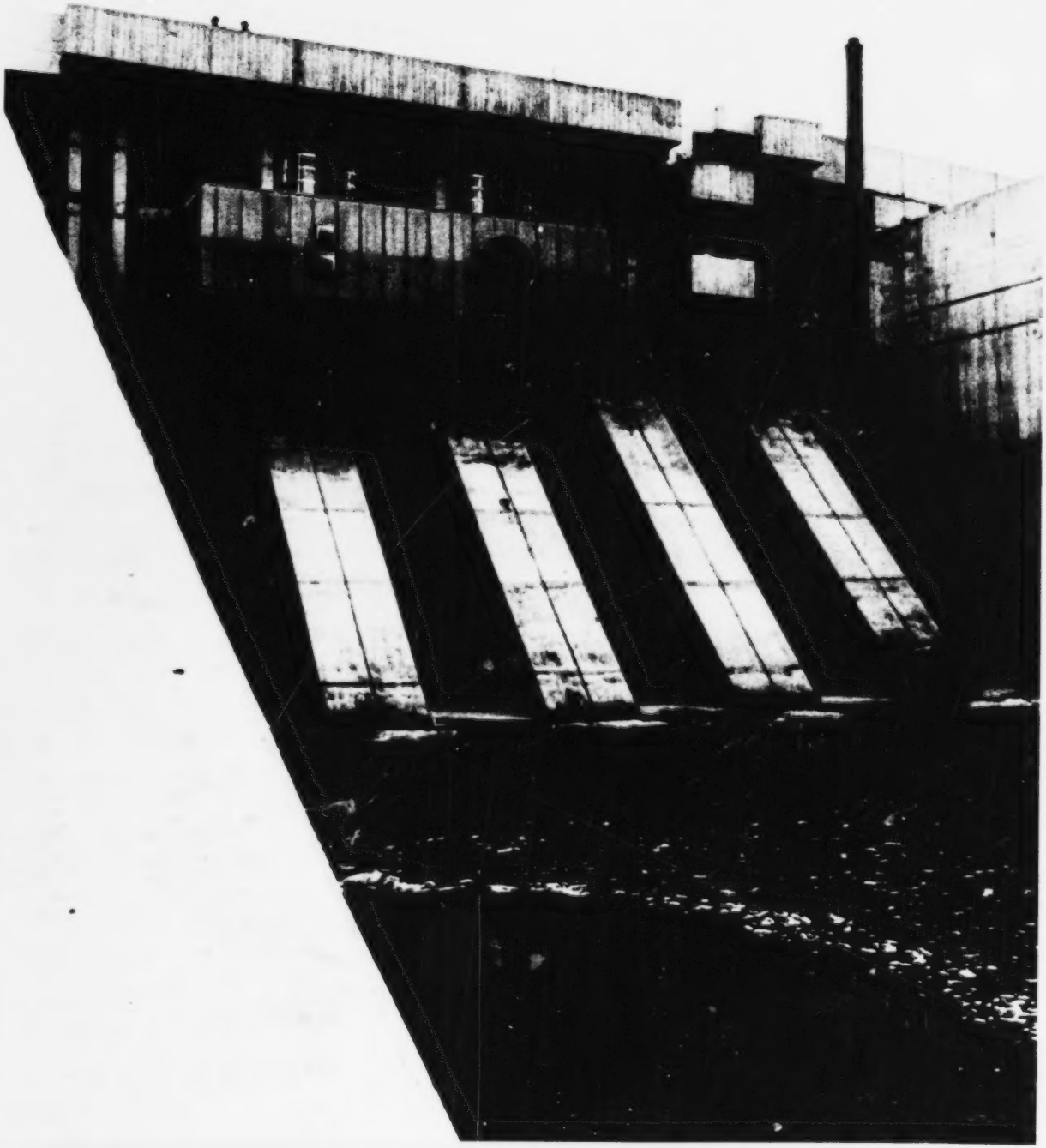
Under the joint direction of the ministry, the federal government, the National Research Council and Ontario Hydro, DAF Indal of Mississauga built a wind/diesel hybrid system capable of producing a maximum of 80kW of electricity. Unlike most wind turbines, the Darrieus, a vertical axis design, does not need to be turned into the wind. The turbine is coupled to a diesel generator and designed to reduce the amount of diesel fuel consumed annually by 25 per cent.

Testing began in February 1982 in Sudbury. If it proves economically and mechanically feasible, a prototype may be installed in a remote northern community. Ontario Hydro is monitoring wind conditions at two possible sites, Fort Severn and Winisk.

Using wind for energy has great potential in developing countries – areas which depend heavily on world-priced oil for electricity generation. The operation and testing of the Sudbury system puts Ontario industry into the forefront of this new technology.

On a much smaller scale it may be possible for individuals to purchase, erect and maintain their own wind generators to provide electricity for homes or cottages in remote locations.

Wind and diesel hybrid power systems for generating electricity may soon become an energy alternative for remote communities. Such communities now rely exclusively on expensive diesel fuel.



Wellington Wind Power, in conjunction with Cer-A-Met Inc., built a 10kW turbine which will undergo testing at the Atlantic Wind Test Site on Prince Edward Island. If it performs reliably, the system will be brought back to Ontario for demonstration and public information purposes.

The ministry plans to publish a windpower handbook in late 1982 for those interested in exploring the wind's potential. The book will provide the technical information necessary to allow an individual to plan, size and cost the components of a small-scale wind energy system for such purposes as supplying electricity for domestic appliances or pumping water.

Rivers at work

To further the Ontario government's efforts to harness small-scale water-power in the province, the ministry is demonstrating several applications of micro-hydro technology at existing dams, mill pond sites and locations that do not require dams or major engineering work.

In co-operation with the Grand River Conservation Authority, a micro-hydro system was installed at the Guelph Dam on the Speed River to show that existing dams can be used for electrical generation as well as flood control. A turbine designed specifically for this installation is operating at over 80 per cent efficiency.

A second micro-hydro system on the Wolfe River northeast of Thunder Bay will use an existing intake pipe and penstock to provide 12kW of electricity to the Ministry of Natural Resources' Dorion fish hatchery beginning in summer 1982.

Small hydroelectric systems installed over a series of rapids with a gradual drop in elevation may also prove feasible. The ministry is studying the economics of these systems at Oba, a remote rail community south of Hearst, and Muskrat Dam, a native community in northwestern Ontario near the Manitoba border. Both studies were to be completed by September 1982.

During 1981/82 the ministry also contributed to the construction of a small hydraulic project in Jamaica. Working jointly with the Ontario International Corporation and the Canadian International Development Agency, the ministry helped fund the installation by providing Ontario-produced technology through a grant to Barber Hydraulic Turbine.

Grand River dam at Guelph generates electrical power for a major portion of the region

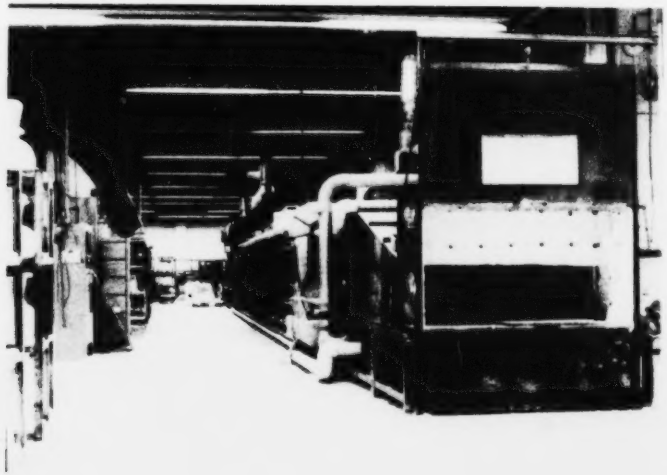
Electricity from biomass

Cedsi Inc. of Ottawa, in conjunction with Forintek Inc., has been awarded a contract to select, install and monitor a small-scale gasification system. The 100kW gasifier, coupled to a dual-fuel generator, will demonstrate the use of wood, peat and other biomass fuels for the generation of electricity in remote communities. The system will be installed and monitored for one year at Lakehead University.

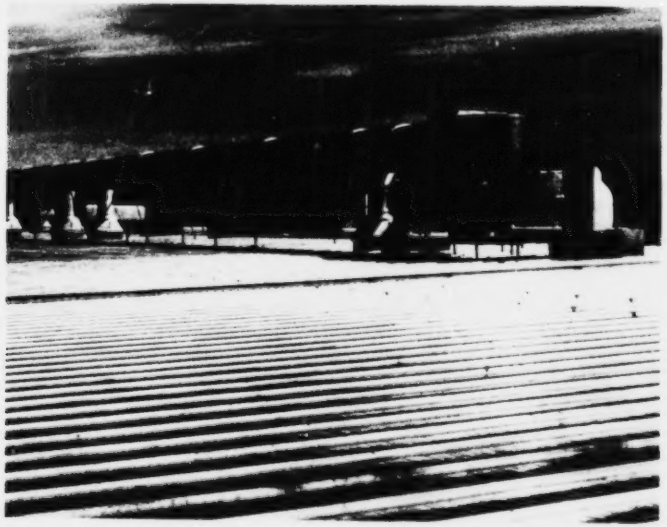
Photovoltaics in the north

Many northern Ontario communities enjoy as many hours of sunlight as centres in southern Ontario. At the moment the cost of photovoltaic power is only attractive in competition with diesel fuel or storage batteries. Consequently the ministry will demonstrate how photovoltaic arrays can be used to operate systems such as navigational beacons, airport lights, radio phones and telecommunications relays.

The Canada/Ontario Conservation and Renewable Energy Demonstration Program



The roller hearth ceramic kiln at Eastern Pottery, Cornwall, reduces the amount of natural gas consumption in large ceramic kilns by using a continuous firing process and a roller conveying system.



The exterior manifold at PPG Industries' glass plant at Owen Sound recovers high temperature clean exhaust air for space heating purposes.

The demonstration of new energy technologies or techniques in practical settings is a key ingredient in developing widespread acceptance throughout the market. Furthermore, the information gleaned from these demonstrations contributes to Ontario's energy efficiency and industrial development.

In 1979 the Ontario and federal governments entered into a five-year, jointly funded, $58 million program to sponsor the development and application of innovative energy-conserving and renewable energy technologies. This co-operative effort promotes the demonstration of technologies which have been thoroughly researched and partly developed and require assistance to tap appropriate markets.

The program shares a portion of the direct costs and a reasonable portion of the indirect costs incurred for project development, demonstration and promotion.

At the close of fiscal 1981-82, joint government funding in excess of $17 million had been committed for 52 projects since the beginning of the program. Third-party or private sector proponents contributed a further $17 million.

Preliminary assessments suggest that for every cubic metre of oil equivalent saved by these projects over the life of the program, Ontario will contribute $37. It is estimated that over a five-year period an equivalent of 159 000 cubic metres of oil will have been displaced or saved on these projects alone. On March 31, 1982, a cubic metre of oil delivered to Toronto-area refineries cost $202.

In addition to the approved projects, 25 proposals are now under review, with new submissions made regularly. Heightened public awareness of this bilateral program, coupled with the success of early demonstrations, has led to an increasing number of unsolicited proposals. This in turn has increased technical liaison and expanded co-operation within the energy field among business, industry and the various levels of government.

Listed are the projects approved for funding in 1981-82.
(For further details on existing projects see the individual programs in the Conservation and Renewable Energy Sections.)

Bilateral program projects approved during 1981/82

Project	Location	Responsibility	Funding
Conservation – buildings			
Time-of-use electricity metering demonstration E. D. Metering Communications Systems Inc.	Port Colborne	MEny	400 000
Queen's Quay lake source heat recovery Olympia & York Developments	Toronto	MEny	150 000
Multi-unit residential energy retrofit Lantana Non-Profit Homes Corporation	Scarborough	MEny	104 000
Exterior insulation Orr Tower Queen's University	Kingston	MMAH	60 000
Commercial/industrial building retrofit promotion Robbins Elliot & Associates	Throughout Ontario	MEny	50 000
Swimming pool dehumidification and heat recovery Town of Arnprior	Arnprior	MEny	50 000
Conservation – industrial and commercial			
Anerobic digestion of waste to produce methane Industrial Grain Products	Thunder Bay	MIT	500 000
Glass plant heat recovery PPG Industries Canada Ltd.	Owen Sound	MIT	176 000
Instant ice generator H. Misner Company	Port Dover	MIT	170 000
Roller hearth ceramic kiln Eastern Pottery	Cornwall	MIT	127 000
Alcohol from waste; preliminary evaluation Industrial Grain Products	Thunder Bay	MIT	20 000
Conservation – transportation and communities			
Water pollution control plant energy recovery system Regional Municipality of Peel	Peel Region	MEny	350 000
Compressed natural gas vehicle demonstration Consumers' Gas Company	Toronto	MTC	142 000
Ice plant heat recovery & energy conservation Scarborough Recreation Centre Borough of Scarborough	Scarborough	MEny	60 000
Renewable – Solar			
Commercial/industrial solar demonstration program	Throughout Ontario	MEny	2 500 000
Ontario Hydro energy-efficient passive solar construction	Throughout Ontario	MEny	467 000
Ontario Hydro solar domestic hot water program phase III	Throughout Ontario	MEny	462 000
Solar-assisted heating for a northern community-centre swimming pool Town of Dryden	Dryden	MEny MNA	175 000
Renewable – agriculture and energy from waste			
Wood/gas/diesel electric power generation Omnifuel Gasification Systems Ltd.	Hearst	MEny	265 000
Greenhouse wood energy plant Foothill Greenhouses Ltd.	Kettleby	OMAF	156 000
Flue gas heat recovery system	Welland	MIT	150 000
Industrial wood waste energy demonstration	Toronto	MEny	150 000
Energy recovery from plant waste	Toronto	MEny	145 000
Wood burning furnace for dry kiln Kakabeka Timber Ltd.	Kakabeka Falls	MEny	140 000
Site-built heat exchanger for grain dryer R. G. Winfield & Associates Blythe Brae Farms Ltd.	Oxford County	OMAF	52 000
Renewable – alternative fuels			
Conversion of cellulose to ethanol (pilot plant) Biohol Developments Joint Venture	Toronto	MEny	1 500 000
Methanol blend transportation fuel, fleet test program Celanese Canada Inc.	Throughout Ontario	MEny	300 000

CODE
MEny – Ministry of Energy
MMAH – Ministry of Municipal Affairs & Housing
MIT – Ministry of Industry & Trade
MTC – Ministry of Transportation & Communications
MNA – Ministry of Northern Affairs
OMAF – Ontario Ministry of Agriculture & Food

Energy conservation

PHOTO COURTESY ONTARIO HYDRO

Overview

Few people take energy costs for granted any more.

Prospective homeowners take into account their future energy bills when calculating monthly house payments. Industry's energy costs are a critical factor in production. The commercial sector keeps a close watch on energy prices because they constitute a large part of operating overhead. And virtually everyone who drives is keenly aware of gasoline prices and consumption.

The Ministry of Energy's energy conservation efforts might better be termed energy-efficiency programs. Their aim is to help all users make the most efficient use of energy in order to save money, increase productivity and, by reducing oil use, contribute to the national goal of oil self-sufficiency by 1990.

By 1995 Ontario's goal is to use 23 million barrels of oil less than we use today. To help stretch this diminishing resource the Ministry of Energy set specific conservation targets in four sectors–residential, commercial, industrial and transportation.

In addition, municipalities have a special responsibility to their taxpayers to be as energy-efficient as possible. A significant proportion of valuable municipal tax dollars goes to pay energy costs. Consequently a municipality that operates its services efficiently, plans its developments with energy use in mind and makes a concerted effort to educate residents in wise energy use will save a tremendous amount of money.

Similarly, Ontario's elementary and secondary schools are beginning to teach energy issues in the classroom. Future generations can only make intelligent decisions about energy if they are well informed about its uses, characteristics and its vital and increasing importance in their lives.

The Ministry of Energy's Conservation Program supports the efforts of these educators and municipalities through direct funding, technical advice and information circulation.

The program also acts as a catalyst wherever possible to encourage energy-conserving actions in all sectors. For example, to provide incentives to reduce Ontario's dependence on oil, the ministry introduced a number of off-oil programs touching on major sectors of the provincial economy.

Fiscal 1981/82 also saw the ministry introduce a new program to help all religious buildings decrease energy consumption, an in-house energy conservation program directed at all provincial government employees and an expansion of the Community Energy Management Program.

While new and renewable energy sources are being developed, energy conservation remains the most effective short-term solution to higher energy prices, shrinking resources and unstable foreign supplies.

Conservation begins at home

The Heat Save Program

About 20 per cent of Ontario's energy consumption occurs in the home.

Ministry studies show that by insulating, lowering thermostat settings, adding or improving storm windows and doors, caulking and weatherstripping, homeowners could reduce heating bills significantly.

In fact the average homeowner could expect to save 20 to 25 per cent on heating bills just by adopting these simple measures.

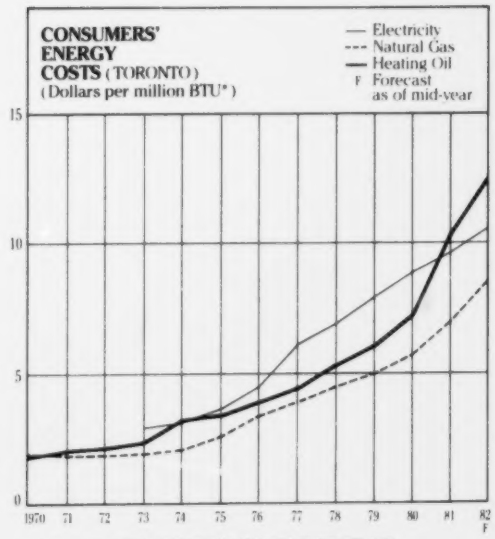
The Ministry of Energy's Heat Save Program is designed specifically to encourage these activities.

Aerial thermograms or 'heat pictures' are taken from an altitude of about 460 metres (1500 feet). These thermograms show grey and white shadings on each roof indicating areas of different heat loss and possible insulation problems.

Homeowners are then invited to Heat Save clinics to discuss the thermograms of their houses with trained interpreters and receive free advice on where improvements can be made.

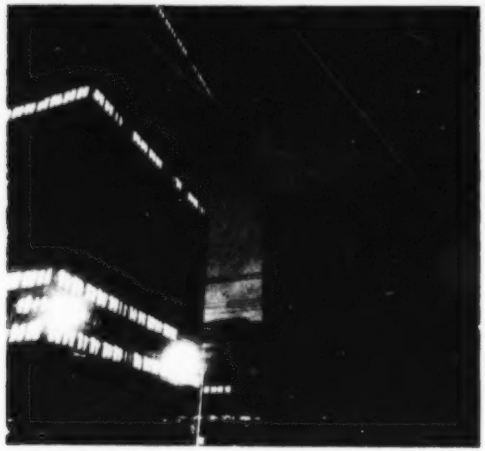
Clinic staff calculate a particular home's energy efficiency using the previous year's heating bill and the floor area of the home. This energy rating tells homeowners whether they are paying too much to heat their homes.

Clinic staff also advise on practical conservation techniques, estimate costs and payback periods for different options and provide information on government financial assistance programs such as the federal government's Canadian Home Insulation Program (CHIP), the Canada Oil Substitution Program (COSP), and the Ontario government's Residential Energy Advisory Program (REAP). (See below for details of these programs.)



SOURCE: MINISTRY OF ENERGY, CANADIAN ENERDATA LTD.

*Adjusted for furnace efficiency
65%, oil and natural gas
100%, for electricity



Energy consumption in government-owned buildings has steadily decreased in recent years.

Since it began in September 1980, the Heat Save program has provided this personal energy-saving information to over 54 000 individual homeowners in the province.

Community response to date (ranging from 34 per cent of eligible homeowners in Sault Ste. Marie to 65 per cent in Cobourg) proves homeowners are genuinely interested in reducing heat loss, in finding ways to improve energy efficiency and, ultimately, in saving money.

During 1981/82 clinics were held in Thunder Bay, Woodstock and an area covering 60 per cent of the City of Toronto.

In Thunder Bay, the largest northern city in the program, 37 per cent of homeowners visited the clinics (from Sept. 22 to Oct. 10, 1981). The Woodstock project operated from November 12 to 25 and attracted almost 43 per cent of homeowners.

The City of Toronto's size required its division into seven areas for the operation of the clinics. Separate clinics were held in the first four areas before the end of March 1982. Clinics will operate in the remaining three areas in autumn 1982.

Operation of the Toronto project also required different communication techniques. Because the mass media serve the entire metropolitan area and beyond rather than just the target areas, newspaper and radio advertising was inappropriate and a direct mail campaign was used instead. Perhaps in part because this approach did not have the same impact as the higher-profile mass media campaigns used in smaller communities, homeowner attendance was not up to expectations, although the consultations themselves were particularly successful.

Assistance and advisory programs

Ontario Hydro began the Residential Energy Advisory Program (REAP) in rural service areas in September 1981. Most municipal customers in Ontario are expected to be able to take advantage of the program by the end of 1982.

REAP services include:

- A free survey of the customer's home, outlining the safety and adequacy of the electrical system, possible conservation measures and heating system conversion options.
- A report of the approximate costs and annual savings in both energy and dollar terms of the measures recommended.
- Information on the latest heating cost trends.
- A list of area contractors who can complete the recommended work.
- Information on government assistance programs.
- A REAP loan from Ontario Hydro of up to $2000 at the interest rate Ontario Hydro itself pays for loans. Where loans are granted, follow-up inspections are performed to ensure the proper use of funds.

The Canadian Home Insulation Program (CHIP) provides taxable grants of up to $500 to homeowners to upgrade the insulation in homes built before 1971. The Canada Oil Substitution Program (COSP) provides taxable grants up to a maximum of $800 to homeowners and businesses to convert from oil to non-oil forms of heating. Both CHIP and COSP are administered by the federal government.

Conservation in government

Government and public buildings

In 1976 the Ontario government set a target of reducing energy consumption in government-owned buildings by 15 per cent over a five-year period.

The purpose was to reduce government operating expenses, conserve depleting conventional energy sources and set an example for the private sector.

The conservation measures proved so successful that the goal was achieved in the second year of the program. By the fourth year Ontario government buildings had reduced energy use by almost 22 per cent for a cumulative saving of over $17 million on an investment of about $9 million—almost two dollars saved for every dollar spent.

In 1981 the government allocated $10.6 million to extend the program for a further five years. The new objective is to reduce energy use by a further 7.5 per cent from the 1980/81 base year.

During 1981/82 the government spent $3.1 million on energy conservation measures such as heat reclamation, timers to shut off mechanical equipment automatically when not required, removal of unnecessary lighting, installation of more efficient lighting and numerous other techniques.

Seventeen projects were completed and the ministry approved over 100 new projects.

Some examples: The Ministry of Community and Social Services is sealing exterior drafts, insulating, modifying the system controls and installing a computer for load management at the Muskoka Centre Gage Building in Gravenhurst.

The Ministry of Education is reducing lighting levels, modifying system controls and installing a heat recovery system at the E.C. Drury School in Milton.

The Ministry of Health is converting the heating system at the Thunder Bay Psychiatric Hospital, installing a heat reclamation system and upgrading the operational procedures.

Savings from 1981/82 activities altogether should be almost $9 million – in energy terms almost 500 million kilowatt hours or approximately 4.7 million litres of oil/year.

Oil substitution program for government buildings

In April 1980 the Ontario government began converting oil heating equipment in government buildings to cheaper, more plentiful fuels under this $2.5 million, five-year program. The original objective was to convert 338 government buildings.

The Ministry of Energy accelerated the program, and by the end of the second fiscal year 184 buildings were converted from oil to natural gas at a cost of $900 000.

These conversions will save over 10 million litres of oil annually. At the present differential in cost between oil and gas prices, this amounts to an annual saving of about $900 000, or enough to pay back the cost of conversion within one year.

Conservation and off-oil conversion program for public institutions

The Ministry of Energy also funds off-oil conversions and conservation measures in municipal buildings, government-funded buildings and institutions such as educational facilities, health care facilities and buildings operated by non-profit cultural, recreational or social service organizations.

This $12 million, three-year program began in 1981. It is divided into two parts, a municipal portion, which receives approximately one-third of the funds (see the Community Energy Management Section for further details), and government-supported institutions, which receive two-thirds of the funding, or approximately $8 million. In this shared-cost program the institution itself funds part of the conservation improvements.

The first priority of the program is off-oil conversion, followed by conservation in oil-fired buildings where it is not yet economically viable to convert to some other form of energy.

During 1981/82 the Ministry of Education converted 78 schools from oil to natural gas, saving over 19 million litres of oil annually – enough to heat over 5700 homes for a year.

The Ministry of Colleges and Universities converted 44 buildings during the first year, again primarily to natural gas, for an annual saving of almost 9 million litres of oil.

Ontario's BEST

The success of government programs in reducing energy consumption in government buildings, public institutions and vehicle fleet operations relies on the skill and dedication of public servants directly involved in these operations.

Significant energy savings can also be achieved through the actions taken by concerned and aware individuals who are not directly involved in building or vehicle operations and maintenance.

On November 12, 1980, cabinet approved the Ontario Government Employee Energy Savers Program entitled Ontario's BEST (an acronym for Big Energy Saving Team) to be co-ordinated by the Ministry of Energy and involving all government ministries and 80 000 employees.

The goal is to motivate government employees to use energy more efficiently at work, practise these same habits at home and thereby set an example of wise energy use for all Ontario citizens.

The Premier wrote to all ministers in July 1981 asking for their support and participation. Subsequently all ministries, two provincial secretariats, the Civil Service Commission and Management Board named representatives to the Interministerial Working Committee, chaired by the Ministry of Energy.

Since July 1981 the committee has identified energy conservation opportunities employees can make use of in their individual work environments, when travelling to and from work, while on business travel and in other job related areas.

Films, speakers, demonstrations, pamphlets, and promotional material will be used as aids to convey the conservation message. All employees will participate in a program of activities beginning in summer 1982.

Conservation in commercial and religious buildings

A team effort to save energy in commercial buildings

Owners and tenants of several major downtown office buildings in Toronto reduced their energy consumption by between 22 and 46 per cent in recent years and are now saving over $3 million annually in energy costs.

The Ministry of Energy encourages and supports energy efficiency in religious buildings.

This volunteer co-operative effort stems from a request made by the Premier in 1978 that government and the business community join forces to reduce energy consumption through the Ministry of Energy's Downtown Energy Conservation Program.

In that first year, 17 Toronto companies began working towards a 30 per cent energy reduction in building operations without making significant or expensive structural changes.

The Toronto effort was such a success that in February 1981 the ministry launched the program in Ottawa with the co-operation of the Building Owners and Managers Association of Ottawa, Ottawa Hydro and Ontario Hydro.

Today 30 companies in Toronto and 14 in Ottawa, managing approximately 2.8 million square metres of office space, participate in a five-point program designed to promote efficient energy use in commercial buildings.

First, each participating company appoints a senior executive to be responsible for energy conservation. Second, the ministry helps these people to develop workshops and case study reviews and offers guidance on energy auditing and individual counselling. Third, companies set corporate objectives for reducing their energy bill, backed up by plans and projects to achieve these goals. Fourth, companies look at photos of their building in the city's night-time skyline with the aim of minimizing lighting levels. And fifth, companies keep track of their energy savings by monitoring their energy use and conservation targets.

Among the companies which have successfully reduced their energy bills is the Toronto Dominion Bank, which changed 5000 fluorescent tubes from 40 watts to 35 watts.

The Canadian Imperial Bank of Commerce saved $180 000 in its first participating year mainly through an elaborate heat reclamation system. Heat pumps recover heat generated by people, lights and machines and use it to heat the perimeter of the building.

The ministry conducts annual Downtown Energy Forums in Ottawa and Toronto to exchange information, encourage awareness of the amount of energy used in these buildings, ask business people to undertake voluntary efforts and invite speakers to address topics of interest such as how to get tenants to conserve energy in leased buildings.

These forums are supported by the Building Owners and Managers Associations, several gas and electric utilities including Ontario Hydro, the American Society of Heating, Refrigeration and Air Conditioning Engineers, the Ontario Ministry of Government Services, Public Works Canada and the Toronto chapter of the Building Maintenance and Cleaning Association.

The Toronto and Ottawa night-time skylines in their reduced lighting already show the commitment of owners and tenants of both cities to energy conservation.

Energy stewardship in religious buildings

Ontario's 10 000 religious buildings pose a special challenge to energy conservation because of their architectural characteristics.

High-pitched uninsulated roofs are notorious energy wasters. Stained glass windows, although beautiful and inspiring, do not readily lend themselves to the addition of storm windows and are rarely double-glazed.

Many religious institutions found energy use becoming an important factor in their budgets when heating costs began to soar. Requests from representatives of several religious communities across the province for assistance in meeting these challenges prompted the ministry to develop a program to save energy in all religious buildings in Ontario.

In June 1981 the ministry appointed an energy consultant to advise on energy conservation opportunities in buildings operated by religious organizations.

To date more than 200 religious institutions have received information encouraging energy efficiency and assistance in plans for off-oil conversions, renovations and alterations. As a result of these ongoing efforts the ministry announced a five-step energy conservation program in March 1982 aimed specifically at religious buildings.

First, a religious community sets up an energy management team made up of qualified members of its congregation. Second, the team surveys energy use in its religious buildings with the help of a questionnaire provided by the ministry. Third, the team sets priorities for affordable energy conservation measures beginning with those that require little effort and expenditure such as lowering thermostats, controlling exhaust fans and turning off lights when not required. Fourth, detailed plans are prepared for larger expenditures, if needed. And fifth, the recommended program is implemented based on available resources and funding.

The ministry sends resource manuals detailing the above steps to all religious organizations that appoint an energy co-ordinator and agree to establish an ongoing voluntary program. Approximately 80 co-ordinators had been appointed by the end of March 1982.

As more religious organizations adopt the program the ministry plans to conduct one-day sessions of workshops and information exchanges for church representatives in various Ontario centres beginning in autumn 1982.

Energy-efficient building technology

Current energy conservation techniques and technology are either inadequate or non-existent for special applications in residential, commercial and institutional buildings.

The Ministry of Energy, working both independently and with the co-operation of other ministries, is developing cost-effective solutions to these problems.

This developmental work encompasses building design, construction, renovation and operation and examines the building shell, heating, ventilation, cooling and lighting systems, and office equipment and household appliances.

Developing high-efficiency boilers

During 1981/82 the ministry continued to support the Canadian Gas Research Institute's development of high-efficiency, gas-fired hot water boilers for commercial and industrial use.

Conventional boilers operate at thermal efficiencies ranging from 40 to 70 per cent, with the balance of the heat lost up the chimney. The new prototype boiler extracts maximum heat from the burnt gases before discharge, thereby achieving thermal efficiencies in the 88 to 93 per cent range.

Beginning in the summer of 1982 the ministry will co-ordinate extensive field testing of the commercial version, while the Canadian Gas Research Institute tests the industrial version.

These high-efficiency boilers have a large market potential, particularly in high-rise office and apartment buildings, schools, hospitals and institutions. Models for commercial and industrial use are expected to reach the marketplace in 1984.

Thermal storage

Heat energy can be collected and stored in a suitable container to be used at a later time with minimal energy loss.

People, lights and office equipment generate heat in commercial buildings. In winter heat produced at the core of the building can be transferred to heat the perimeter areas. Moreover, thermal storage enables excess heat to be retained to keep the building warm during unoccupied periods. A building's heating and cooling plant capacity can be minimized and operated at higher efficiency. And peak electrical demand charges are reduced.

In 1981 the Ontario and federal governments announced they would contribute $31 000 to measure the effectiveness of a thermal storage system at College Park, a commercial complex in downtown Toronto. The total project cost is approximately $436 000. Projected savings are estimated to be $125 000 a year at current energy prices.

Building exteriors

Under the Housing Energy Management Program (HEMP) the Ministry of Energy and the Ministry of Municipal Affairs and Housing administer more than 30 individual projects aimed at improving the energy efficiency of building exteriors and heating, ventilation and hot water systems.

The Ministry of Energy is also exploring the advantages of external insulation of large commercial buildings or multi-unit residences externally. Internal insulation takes up space and is only practical to cover exposed wall areas. External insulation can blanket an entire building and is more efficient from an energy and economic point of view.

In 1981/82 the Ontario and federal governments funded a portion of the cost of insulating the exterior of the Orr Tower, an existing student residence at Queen's University in Kingston.

This is government's first attempt at insulating the exterior of a large existing building. The energy consumption and thermal performance of the building will be monitored for some time to gauge the actual savings and effectiveness.

This and other similar projects will enable the Ministry of Energy to establish the most practical and cost-effective methods of insulating large and high-rise buildings.

With the Ministry of Consumer and Commercial Relations the Ministry of Energy is developing higher standards for energy efficiency in new residential construction which are expected to be incorporated into the Ontario Building Code in autumn 1982.

Energy-efficient land use planning saves tax dollars.

The Ministries of Energy, Consumer and Commercial Relations, Municipal Affairs and Housing and Health are examining concerns about air quality in air-tight houses (moisture buildup and the accumulation of common household contaminants) and have been working towards developing standards for new residential construction to ensure a healthy indoor environment.

Community energy management

Municipal leaders can reduce energy consumption and save tax dollars by skilful management of municipal responsibilities such as buildings and facilities, transportation and land-use planning, vehicle fleets, traffic and waste disposal. Furthermore, their example can promote an awareness of energy consumption patterns and methods of conservation in their communities.

Voluntary action

In 1978 the Ministry of Energy established, with the Association of Counties and Regions of Ontario, a joint Provincial-Municipal Advisory Committee on Energy Conservation to begin encouraging municipalities to adopt voluntary energy conservation programs. The Committee, now with the participation of the Association of Municipalities of Ontario, offers advice on buildings, transportation, street lighting, urban planning and municipal waste disposal.

To date more than 150 municipalities representing over 80 per cent of the province's population have appointed energy co-ordinators to administer conservation programs.

Some notable early achievements occurred in the Borough of Scarborough—a 20 per cent energy reduction, resulting in over $500 000 saved—and in Burlington—a 15 per cent reduction for a $41 000 saving.

Energy savings in the community at large remain to be addressed. Saving energy requires long-range planning, voluntary co-operation, monitoring procedures and effective follow-up programs.

During 1981-82 the Ministry of Energy implemented several programs geared at helping Ontario municipalities accelerate their energy conservation efforts and overcome three major stumbling blocks:

- lack of funds;
- lack of technical knowledge; and
- lack of clear perception of the municipality's role in energy matters.

The Ontario Municipal Energy Audit Program

This three-year, $3.6 million program, administered jointly by the Ministries of Energy and Municipal Affairs and Housing, provides municipalities with funds to employ qualified energy conservation auditors.

The auditor is responsible for monitoring energy consumption in municipal operations and either establishing an energy conservation program or expanding an existing one.

The ministry funds up to 80 per cent of the cost of employing the auditor to a maximum of $20 000 in the first year, $18 000 in the second, and $15 000 in the third year. The municipality absorbs the remaining costs.

By the end of the fiscal year, 29 municipalities had appointed energy auditors. The first group of auditors were trained at Mohawk College in Hamilton in March 1982.

Municipal Oil Conversion and Energy Conservation Program

This $4 million program shares the cost of converting oil-heated municipal buildings to alternative fuels and upgrading the buildings' thermal quality.

In 1981-82 grants applied to the cost of conversion from oil to an alternative fuel. In 1982-83 grants will also help pay for upgrading activities such as improved insulation, heat recovery and caulking.

Estimates indicate that a $175 000 expenditure in 1981-82 will save almost 4.6 million litres of oil. New year's budget is $1.2 million, with a predicted saving of 13.7 million litres of oil, or approximately $3 million.

Since the program's announcement in September 1981, more than 300 applications have been received.

Community Energy Management Demonstration Program

When a municipal government develops a long-range plan to improve the efficiency of energy use throughout the community it is practising good community energy management.

In October 1981 the ministry sponsored a seminar in Toronto to discuss all aspects of community energy management and to invite proposals from Ontario municipalities to take part in the ministry's Community Energy Management Demonstration Program (CEMD).

The demonstration focuses on the three areas where municipalities can influence energy conservation most directly:
- municipal operations—buildings, fleets and the provision of services,
- land-use and transportation planning, and
- community action and education.

Any municipality in Ontario that appointed an energy co-ordinator as part of the voluntary Municipal Energy Conservation Program was eligible to submit a proposal.

The communities selected for the demonstration—Brampton, Burlington, Ottawa and Stratford—had previously undertaken energy conservation projects which were to be pursued and expanded under the CEMD Program.

Each community is required to produce and adopt a community energy management plan which will guide local energy actions. This requires the establishment of a separate energy office. The plans will include a description of the local energy situation; specific targets and goals; policies, strategies and community outreach activities to achieve these goals; and methods of monitoring the project's results.

The demonstrations explore various approaches to community energy management planning for different sizes and locations of municipalities and allow the ministry to gauge public reaction and interest in community-based conservation programs.

Energy Conservation Through Land-Use Planning Grants Program

Efficient land management saves energy. Medium-density housing reduces energy consumption in space heating, allows for more efficient municipal services and offers greater potential for public transit, car pooling and district heating.

This program helps Ontario municipalities re-examine their land-use planning practices to ensure the efficient use of energy resources within the community.

This program is funded by the Ministry of Energy and administered by the Ministry of Municipal Affairs and Housing specifically to help municipalities with populations of more than 15 000. (A separate grant program—Community Planning Study Grants—is administered by the Ministry of Municipal Affairs and Housing for municipalities with a population of less than 15 000.)

The grants cover 75 per cent of the cost of a study, to a maximum of $50 000 per study. The program will be extended in 1982-83 with a budget of $300 000.

Lebreton Flats Project

During 1981 the federal and Ontario governments, the City of Ottawa and three non-profit housing co-operatives built a district heating system in Ottawa's Lebreton Flats housing project.

Ontario and the federal government shared the $1.5 million cost of Canada's first European-style district heating system, which supplies space heat and hot water to 200 townhouses and apartment units.

Hot water is piped to each house, where the heat is extracted and distributed in a forced-air system. The central boiler burns natural gas but may be adapted to use fuels such as municipal garbage, wood waste or coal.

The project is a good example of local energy management. As energy trends change and energy prices fluctuate, the residents of Lebreton Flats may be able to turn to alternative fuels with far greater ease than those with individual furnaces.

Hamilton Redevelopment Project

At the City of Hamilton's request the ministry is helping to demonstrate that attractive, energy-efficient, family-oriented, medium-density housing can be constructed in an established urban area. The location is a 7700 square metre site close to City Hall.

This project is intended to encourage other energy-efficient residential developments while providing family housing that blends into an existing mature urban neighborhood.

The Ministry of Energy will award cash prizes of $10 000 for the winning design and $4 000 each for runners up. The final designs will be publicized to promote energy efficiency in residential developments.

Planners' Energy Handbook

The ministry is preparing a series of reports illustrating techniques for conserving energy through land use planning. These reports are being published separately and will be incorporated into a planners' energy handbook in late 1982. An advisory committee with representatives from municipalities and the Ministry of Municipal Affairs and Housing is assisting in the development of the handbook.

The technical reports will address the following topics:
- Solar energy and land use
- Solar zoning techniques
- Landscape planning for energy conservation

In Lebreton Flats, Ottawa, district heating is used for three non-profit co-operatives, to supply space heating and hot water for 200 townhouses and apartment units.

Vanpooling is a significant energy conservation measure. By replacing as many as 11 cars, each van can save up to 34,000 litres (7,500 gallons) of gas per year – assuming the average round trip of vanpoolers is 70km (43.5 miles)

- Energy supply technology and land-use planning
- Estimating energy costs of new developments
- Climatic information for energy-conscious planning
- Energy and rural planning
- Community energy profiling

Demonstration of community outreach

Municipal governments, community groups and agencies can influence energy action through information exchange and education. Consequently there is a need to demonstrate different types of community-based action.

By providing financial assistance the ministry encourages municipalities to initiate community-oriented energy programs such as the Richmond Hill Energy Information Centre, the Peel Urban Energy Centre and the Toronto Energy Conservation Community Outreach Project in the expectation they will stimulate other municipalities to consider similar actions.

Richmond Hill Energy Information Centre

Richmond Hill Hydro, in co-operation with the Town of Richmond Hill and neighbouring utilities, operated a travelling energy conservation information centre that visited each town (Markham, Vaughan, Aurora and Richmond Hill) from March to September 1982.

The ministry provided $31 420 (55 per cent) of the cost of establishing the centre, which offered practical how-to-do information on all aspects of home energy conservation.

Peel Urban Energy Centre

This centre opened in early 1982 in the Enercon Building on the Sheridan College Campus in Brampton.

Among its many activities it offers energy-related courses, workshops and seminars to the public and private sectors in the Peel and Halton Regions and maintains an up-to-date Energy Resource Centre.

The ministry contributed $46 000, or 47 per cent of the total cost in the first year, and 24 per cent in the second year, to the project.

Toronto Energy Conservation Community Outreach Project

This pilot project began in January 1982 and is jointly funded by the City of Toronto and the Ministry of Energy. The ministry contributed $146 400, or approximately 65 per cent of the project's total cost.

A project co-ordinator and field workers advise homeowners in the Riverdale area about home insulation grants, oil substitution, home energy surveys, Heat Save clinics, retrofitting and other energy conservation methods.

The project also arranges for homeowners to use Toronto Hydro's home energy audit service (on request), offers the services of City of Toronto building and inspection staff to provide advice on retrofit and conducts workshops for builders.

If successful, the project may be extended to other areas in the City of Toronto.

City of Mississauga – Mayor's Task Force on Energy Conservation

The ministry contributed $10 000 to the preparation of a report and implementation strategy for energy conservation in the city of Mississauga.

In spring 1981 the Mayor's Task Force on Energy Conservation was formed to assist the City of Mississauga in implementing recommendations about conservation and renewable energy use policies, to heighten public awareness of potential benefits and to demonstrate how the community can become more energy-efficient.

This citizens' group researched opportunities for buildings and land-use planning, transportation, waste management, lifestyle and communications, and recommendations were made for implementing an energy conservation strategy.

Transportation energy management

The transportation sector consumes approximately half the oil used in Ontario. Because it moves the people, goods and services so necessary to an industrial-based economy, it must operate as efficiently and cost-effectively as possible. For vehicles, conserving energy is a must.

Government efforts to help reduce energy consumption are directed at three major consumers – private vehicle owners, commercial fleet truck operators (both cars and trucks) and municipal operators.

The Transporation Energy Management Program (TEMP), a joint effort of the Ministries of Energy and Transportation and Communications, conducts several programs aimed at reducing the transportation sector's energy consumption by 10 per cent by 1985.

These concentrate on improving the energy efficiency of transportation technology and operations, encouraging more efficient modes of transportation, promoting the use of alternative fuels and reducing the need for travel by, for example, promoting teleconferencing.

Ridesharing

Van pooling saves energy and is a sensible alternative for people who live near each other and have a common work destination.

TEMP's outreach program encourages major employers with more than 500 employees to form van pools. To date, 96 company-sponsored van pools have been formed representing a saving of almost 2 million litres of fuel annually.

The Ontario Van Pool Organization Limited (OVPO), a subsidiary of the Ontario Energy Corporation, encourages greater use of van pooling by offering a 'third-party' service providing, at cost, both a van and an administrative service to people who wish to commute by van pool. OVPO now operates 30 van pools, representing an annual saving of almost 600 000 litres of gasoline.

In 1981/82 TEMP studied the feasibility of setting up an area-wide matching centre with a central office in Toronto. People would call such a centre, tell where they lived, where they wanted to go and hours worked and be matched with other prospective car or van poolers. A pilot centre will be set up in Toronto in 1982/83 to build up an information data base.

Teleconferencing

Teleconferencing substitutes the telephone conference call for travel. TEMP actively promotes the use of teleconferencing in the public and private sectors as an effective means of saving transportation energy.

Within the Ontario government existing teleconferencing demonstrations in the Ministries of Transportation and Communications, Environment and Northern Affairs were complemented in 1981/82 by new ones in the Ministries of Energy and Revenue.

Polysar in Sarnia began using teleconferencing this year, and several other companies are studying its feasibility.

Drivesave

Drivesave is a TEMP program aimed at helping fleet operators of light vehicles (cars, vans, and small trucks) conserve energy. The program has shown that drivers can save between 10 and 25 per cent in fuel consumption simply by improving their operation, use and maintenance habits.

In 1981-82 Drivesave instituted a training program for commercial fleet drivers which enjoyed a good response from the private sector. Twenty-four seminars were conducted in varying locations around the province. Participants saw a slide show and received written material, including a driver's handbook and a fuel economy calculator.

General Mills Canada incorporated the Drivesave training package into its Fuel-Efficient Driving Program. In doing so, General Mills became the first company in Ontario to establish a Drivesave Auto Fleet Program for fleet vehicle operators.

With the help of the Ontario Motor League, TEMP conducted maintenance clinics in Kitchener and Toronto during which almost 1400 drivers had their car engines tested and were advised on how to improve their fuel economy by such actions as inflating tires fully and replacing clogged filters.

Beginning in 1982 the Ministry of the Environment will distribute Drivesave literature to the general public during the ministry's vehicle inspections for emissions. This will reinforce the connection between fuel economy and emission levels.

'The Drivesave Zone', a film teaching high school students the importance of fuel-efficient driving, was also developed during the year to be used as part of the high school drivers' training curriculum developed by the Ministry of Transportation and Communications.

Trucksave

Trucksave, carried out with the co-operation of the Ontario Trucking Association and private industry, continued to promote fuel efficiency in truck fleet operations by publishing how-to-material for owner-operators and fleet managers.

With the advice of the Trucksave Advisory Committee, TEMP produced pamphlets on the cost of unnecessary engine idling, the effectiveness of driver training and other conservation measures and the importance of engine temperature control.

Booklets specifying truck fuel economy data are being prepared for publication in 1983. Canadian Trucking Association booklets on drag reduction and energy-efficient engine options were reprinted for the Ontario market.

Requests continue to come from as far afield as Australia, New Zealand and Great Britain for copies of 'Easy Goin', a slide show and information kit for energy-efficient driver training. More than 300 audio-visual packages and 40 000 pamphlets have been sold to date, primarily to fleet operators in Ontario, other provinces and the United States.

Aerodynamically designed trucks dramatically increase energy efficiency.

Telerider program in Ottawa helps improve service so fewer people drive cars

Private sector initiatives to save truck fuel have been excellent. Since the spring of 1976, Sears has reduced its fuel consumption by over 30 per cent through increased driver training and a more efficient maintenance and safety program.

Kingsway Transports Ltd. converted its highway fleet from gasoline to diesel, improved trailer design and conducted maintenance programs emphasizing fuel economy. The company also added fuel-efficient vehicles to its fleet, which has saved 30 per cent in fuel costs between 1975 and 1980. The 'Easy Goin' audio-visual presentation was given to employees in 1981, and Kingsway expects this presentation should further reduce their fuel consumption by 5 to 15 per cent.

Drive Propane

The Drive Propane program promotes the use of propane as a gasoline substitute especially for use in commercial fleets of cars and trucks. This promotion and information program accompanies a range of tax incentives for alternative fuels provided by the Ontario government and a federal grant program for commercial vehicles.

In December 1981 the Ontario government concluded a one-year Drive Propane demonstration comparing almost 300 fleet vehicles operating on propane to similar gasoline-powered vehicles on the basis of operational costs, fuel consumption and maintenance.

The results showed an average annual cost reduction of 34 per cent for the propane-powered cars despite an increase in fuel consumption (in L/100 km) of 15 per cent because propane contains less energy per litre than gasoline.

Drive Propane's goal is to convert 40 000 Ontario vehicles to propane by 1985. Over the winter of 1981-82 the conversion rate was about 1000 a month, resulting in an estimated 14 000 propane-powered vehicles on Ontario roads by the end of March.

Several municipalities have begun fuel economy programs, among them the City of North York, which purchased 15 propane-powered garbage trucks in 1981.

Companies such as Sears, Simpsons, Workwear and Bell Canada have switched many of their trucks to propane. Halton Regional Police, Belgoma Transportation in Sault Ste. Marie and the Region of Durham have also switched some or all of their fleet cars to propane.

In January 1982 the Ontario government accelerated its internal propane conversion program, which will convert an additional 2000 government vehicles by 1987.

Municipal and intercity transportation

The Ministry of Energy encourages the use of more energy-efficient modes of transportation such as public transit. One way to increase transit ridership and revenues without substantially increasing costs is to encourage greater ridership outside peak rush hours.

The Teleride Corporation and the Ontario Energy Corporation have jointly developed a computerized transit information system called Teleride aimed at raising off-peak ridership.

OC Transpo—the Ottawa-Carleton municipal transit authority—implemented the Teleride system on a trial basis in September 1980. Riders phone a number which tells them when the next two buses are scheduled to arrive at their stop.

OC Transpo initially tested one-third of their service area. The Ministry of Energy provided an additional $20 000 funding to examine the extent to which this new information system attracted new riders.

The results showed that net off-peak ridership increased 8.2 per cent, for a 2.8 per cent increase overall. On an annual basis for the entire OC Transpo service area, this translates into 2.6 million additional rides. The success of the experiment led OC Transpo to expand it to their whole service area in 1981-82.

TEMP also funded a traffic management study entitled Traffic Management Measures to Reduce Energy Consumption, which assessed various energy-saving techniques such as signal-timing, restricted parking and bus lanes to determine their impact on traffic patterns.

Using the findings of this study, TEMP collaborated with the Regional Municipality of Hamilton-Wentworth and the City of Hamilton to examine several energy conservation options in Hamilton-Wentworth. The study recommended establishing an express bus service, promoting ridesharing and promoting alternative work schedules.

A TEMP report evaluating methods of giving high-occupancy vehicles preferential treatment in parking, on metered bypasses to restrict traffic flow or in exclusive lanes on freeways will be published in late 1982.

Installation of computer-controlled traffic signal systems continued in Brantford, Waterloo and Durham. These systems help to improve traffic flow and to reduce energy consumption.

The Municipal Transportation Energy Advisory Committee (MTEAC), composed of municipal representatives, public transit operators and the Ministries of Energy and Transportation and Communications, helps municipalities conserve fuel in their

municipalities and their own vehicle operations primarily by exchanging information through newsletters and seminars. The Committee advises TEMP on municipal programs.

In 1981/82 MTEAC and TEMP conducted seminars throughout the province to promote energy conservation measures in areas such as fleet management, road construction and maintenance, transit service and transportation and land use planning.

These seminars were a sequel to the successful series organized in 1980-81, and are based on the information being developed for the Transportation Energy Analysis Manual, which TEMP will publish in 1982 for transit operators, municipal engineers and planners.

Energy education

The energy education program, created in 1977, is a co-operative effort of the Ministries of Energy and Education and the Ontario Teachers' Federation to help Ontario students understand and appreciate energy's importance to society.

The program focuses on four areas: professional development, curriculum development, teaching aids and outreach activities.

Professional development

In July 1981 40 primary school teachers attended the fourth annual two-week summer energy seminar at the University of Guelph. Since 1978 these seminars have provided teachers with energy information, teaching aids and assistance in developing new teaching approaches and materials for the classroom.

In January 1982 participants from previous summer seminars attended a symposium, 'Energy Education in the 1980s,' in Toronto to exchange ideas in energy education, identify upcoming issues and recommend to the Ministries of Energy and Education and the Ontario Teachers' Federation directions for energy education in the 1980s.

Beginning in 1982/83 the Ministries of Energy and Education and the Federation will run a series of regional workshops to familiarize hundreds of teachers with ministry curriculum documents and resource material.

Curriculum development

The Ministry of Education, supported by funding and technical assistance from the Ministry of Energy, continued preparation of *Energy in Society II*, a curriculum resource guide containing up-to-date information on conservation and renewable energy for teachers at the secondary school level. The guide will be published in November 1982.

Energy in Society I (1978), the first curriculum guide for teachers of Grades 7 to 13, was translated into French, and more than 2000 copies were sent to all French schools in Ontario.

Two more booklets in the *Curriculum Ideas for Teachers* series were produced—*Energy and Water* and *What is Energy?*—bringing the total now available to junior and primary teachers to eight. An additional seven booklets are planned for 1982/83 to complete the series of 15. French translations of the first four booklets in this series were also distributed.

Teaching aids

The Ministry of Energy is printing a set of colourful posters on energy concepts to be distributed to all boards of education. Preliminary development has also begun on an energy film for junior division teachers and students.

The ministry also provides additional information on energy topics to teachers and students apart from that contained in the curriculum guides.

Outreach activities

During this past year the Ministry of Energy continued to assist Energy Educators of Ontario (EEO). This volunteer network of over 400 teachers provides energy education information, promotes energy as a subject in the existing Ontario curriculum and publishes a newsletter and newspaper entitled *Energy Alert*.

In 1981 EEO gained status as a non-profit corporation and actively solicited funding from both government and private sectors. It also published two new editions of *Energy Alert* and five new Starter Kits—sets of teaching ideas and resource material for primary and secondary teachers.

Energy education in action

Thanks to the efforts of energy-conscious teachers, several schools and school boards throughout the province have undertaken energy projects that generate student interest and also promote general interest on energy subjects within the community.

The Stormont, Dundas and Glengarry County Board of Education engaged classes from kindergarten to Grade 13 in examining energy-saving devices in their schools with mock-ups, tours and explanations. It conducted a workshop for making solar models and set up a computerized energy monitoring system that allows classes to receive quick feedback on their energy conservation efforts.

Children learn about energy conservation in class.

Ontario's Energy Bus, funded by the Ministry of Energy, Ministry of Industry & Tourism and by Energy, Mines and Resources Canada, provides energy consumption analysis and cost-saving advice to the province's industries.

The Campbellford District High School reorganized its general level Grade 10 science course around the theme 'Our Environment—A Finite Energy Resource'. The course offers an introduction to energy and a basic introduction to environmental structure and ecological relationships. Students discover that all major decisions ultimately affect our energy supply.

These are just a few examples of energy-related programs being carried on at well over one hundred school boards in the province to ensure that students become aware of wise energy use and thus better able to make decisions that can contribute to a secure energy future.

Conservation in industry

Ontario's industries use about 10 per cent of all the crude oil consumed in the province and 40 per cent of Ontario's secondary energy.

Since the industrial price per unit of fuel oil and natural gas in Ontario has tripled since 1975 and is projected to double again by 1988, energy conservation makes good economic sense. An industry that uses energy efficiently lowers its operating costs and has a better chance of maintaining a competitive position.

Since 1980 the Ministry of Energy has provided funding and policy guidance for a joint Industrial Energy Management Program administered by the Energy Group of the Ministry of Industry and Trade.

The management program has seven conservation goals:

- to encourage industry to adopt energy management plans;
- to provide incentives to industry to switch from oil to more abundant indigenous resources;
- to provide incentives to capture and reuse waste energy sources;
- to increase the energy efficiency of plant equipment and facilities through the application of retrofit projects;
- to improve plant use efficiency on a per-unit-of-production basis;
- to support industrial initiatives in developing new energy conservation processes using novel and state-of-the-art equipment;
- to research conservation barriers and recommend changes in existing legislation to overcome obstacles.

Under the three-year, $10 million Industrial Energy Conservation and Oil Substitution Incentive Program, the Ministry of Energy offers grants of up to $50 000 to manufacturers who fit plants and equipment with energy-efficient systems or who substitute more abundant fuels for oil.

Since the program's announcement in October 1980, 917 companies have applied for grants in aid of $35 million in private investments.

The conversion projects approved in 1981–82 will save over 95 million litres of heating oil. Energy conservation measures approved for grants have already saved the equivalent of 60.5 million litres of oil, worth a total of $12.5 million.

The Energy Bus

The provincial Energy Bus Program, operated by the Ministry of Industry and Trade, is now in its fifth year of operation helping industry and commercial enterprises identify energy-saving measures.

At the invitation of company executives, technicians perform a free inspection of business or factory, give plant managers an on-the-spot analysis of their energy consumption patterns and identify energy-saving opportunities and payback periods. To date, the Energy Bus has visited 1589 companies and highlighted more than $54 million in potential energy savings. This amounts to an average possible saving of $38 000 for each company visited.

Industry initiatives

Several Ontario industries voluntarily adopted energy conservation programs and targets in the last few years.

The Brewers' Association of Canada reduced their energy consumption by 11 per cent between 1975 and 1980. The Association is now aiming at a new goal—to lower energy use by more than 23 per cent by 1985. Several breweries appointed energy co-ordinators and established company energy conservation programs. Today the Canadian brewing industry uses oil in only about 15 per cent of its operations, relying instead on natural gas for approximately 66 per cent of its energy supply and electricity for the remainder.

The chemical industry has been the best energy-saving performer among the 16 industry groups represented in the Canadian Energy Conservation Task Force. The Chemical Industry Task Force for Energy Conservation set a 1980 improvement goal of 17 per cent over 1972 base year rates. The actual 1980 improvement was 22.4 per cent. Participating companies are further committed to a 1985 goal of 31 per cent improvement in energy operating costs.

The Union Carbide Canada Ltd. polyethylene plant, built in 1978 near Sarnia, is operating with 45 per cent of the energy that would have been used in a comparable plant built in 1972. This

was achieved through process innovations, new technologies and a plant designed to today's insulation standards. Union Carbide cut its overall energy consumption in Canadian plants by 26 per cent since 1972, for a saving of $22 million a year.

The Hayes-Dana plant in St. Catharines switched from oil to electric induction heating for its forging furnace with the help of a $50 000 ministry grant. On just one unit this substitution resulted in a saving of $56 000 a year over the previous cost of firing with oil.

Industrial energy saving technology demonstrations

Under the Canada/Ontario agreement the Ontario and federal governments have contributed more than $1.9 million to seven industrial energy conservation projects worth more than $28 million.

Among the projects funded in 1981/82:

Waltec Inc. is developing an energy-efficient ceramic kiln at its Eastern Pottery division plant in Cornwall with the help of a $127 000 grant under this program. The new roller kiln will conserve approximately 33 terajoules, or 9 million kilowatt hours, of energy annually at a projected saving of more than $1 million by 1985. Furthermore, the system has the potential of being used in a dozen or more large plants in Canada.

Industrial Grain Products received a $500 000 grant from the Ontario and federal governments to install a waste treatment system which generates energy from effluent before it is discharged into a local river. The system will convert waste material into methane gas replacing one-quarter of the plant's natural gas needs and saving $100 000 in energy costs the first year alone.

With the help of a $176 500 grant from the Ontario and federal governments, PPG Industries Canada Ltd. will recover excess heat from the glass-making process to heat its Owen Sound plant. The company expects to save more than 50 per cent of the glass plant's annual space heating costs, recovering its investment in approximately three years.

Among the demonstrations the ministry is reviewing for fiscal 1982/83 are innovative approaches to boiler waste heat recovery, waste heat storage and energy upgrading systems for manufacturing operations; efficient summer air conditioning from manufactured winter ice; improved ice making from brine solutions for the food and beverage sector; and anaerobic digestion systems to produce boiler fuel from cheese whey in food manufacturing.

Cogeneration

A cogeneration system is designed to make the most efficient use of heat from a single fuel source by using the thermal energy to generate electricity as well as for process heat or water or space heating. A cogeneration system is particularly efficient because it uses considerably less fuel than would be required to produce the same quantities of electricity and heat independently.

In 1981/82 the ministry provided the University of Ottawa with $158 000 to install a cogeneration system that will increase energy efficiency and help the university become a centre of expertise for demonstrating energy-efficient technologies.

The university currently heats with steam produced from natural gas and buys power from Ontario Hydro for its electrical needs. The new system will use a one-megawatt, steam-powered turbine/electrical generator combination. When connected to the university's natural gas–fired boiler, this arrangement will produce 10 per cent of the university's electrical energy needs while simultaneously utilizing the exhaust steam from the turbine for the heating system.

Ontario's concentration of heavy industries with large process steam requirements make the province unusually suited to cogeneration. Furthermore, cogeneration will become increasingly attractive as the cost of conventional energy continues to rise.

Ministry studies suggest that up to 5750 MW of electrical power are technologically available within the province through cogeneration. This represents about 20 per cent of Ontario Hydro's capacity and could provide important advantages such as improved thermal efficiency, flexibility and diversity of fuel usage.

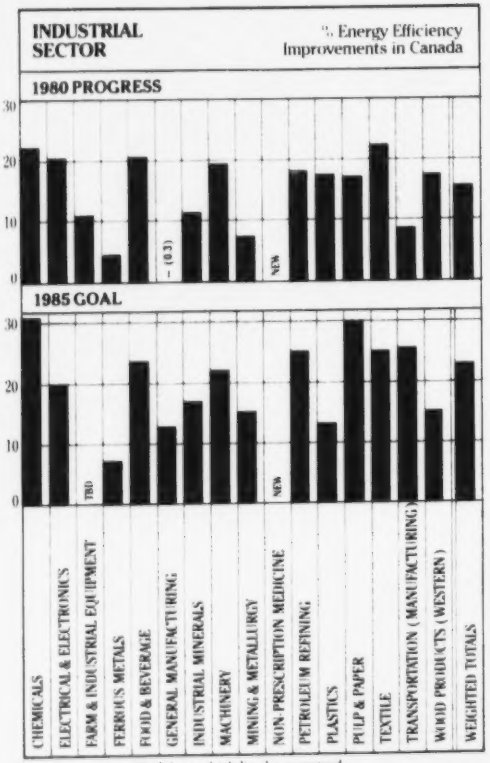
Ontario Hydro supports cogeneration through the establishment of provisional rates for purchasing cogenerated electric power from industry.

In co-operation with Ontario Hydro and the Ontario Energy Corporation, the Ministry of Energy is contributing to an analysis to assess major potential cogeneration opportunities.

Ontario Hydro conducted a market survey of some 30 locations and selected the 10 most promising candidates for cogeneration projects.

Each selected company will be studied in depth to determine cogeneration potential, project cost, payback period and contribution to the provincial electrical utility.

The Ministry of Energy will use this information to develop a cogeneration policy and program to assist future cogenerators.



*Based on prior methodology which has been revised.
SOURCE: CANADIAN INDUSTRY PROGRAM FOR ENERGY CONSERVATION, 1980 REPORT

PROGRAM ESTIMATES SUMMARY

1982 - 83 ESTIMATES $	PROGRAMS	1981 - 82 ESTIMATES $	1980 - 81 ACTUAL $	1980 - 81 ESTIMATES $
6 132 400	Ministry administration	3 682 000	2 037 343	3 081 116
3 218 000	Conventional energy	2 673 000	2 068 182	2 786 000
25 985 900	Alternative and renewable energy	12 153 000	4 363 774	6 554 000
28 862 800	Energy conservation	23 603 000	15 856 040	16 847 000
2 326 700	Regulatory affairs	1 710 000	1 443 905	1 465 000
62 240 000	Energy supply	—	New activity	—
128 765 800	**Ministry total**	43 821 000	25 769 244	30 733 116
N/A	**Less: Special warrant**	26 478 000	N/A	N/A
30 500	**Less: Statutory appropriations**	27 500	27 500	25 116
128 735 300	**TOTAL TO BE VOTED**	17 315 500	25 741 744	30 708 000
	ACCOUNTING CLASSIFICATION			
66 525 800	Total budgetary expenditures	43 821 000	25 769 244	30 733 116
62 240 000	Total disbursements	–	–	–
128 765 800		43 821 000	25 769 244	30 733 116

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